Tribhuvan University
Institute of Science and Technology
4 Years Bachelor in Computer Science and Information Technology (BSc. CSIT)
Entrance Examination 2069

Full Marks: 100
Time: 2 hrs.

Attempt all questions:

Mathematics (25 × 1 = 25)

1. If $f(x) = \sqrt{4-x^2}$ then f(2) is
   a. 0 b. 4 c. 2 d. -2
2. If $|x| = 2$ then the solution set is
   a. {2, 2} b. {-2, 2} c. (-2, 2) d. [-2, 2]
3. If A, B and C are non-empty sets and $A \subset B$ then $A \cap B$ is
   a. B b. A c. empty set d. C
4. The smallest prime number is
   a. 1 b. 0 c. 2 d. -1
5. The curve $y^2 = 4x$ is symmetric about
   a. Y axis b. X axis c. both axes d. origin
6. The value of x for $\sum_{i=1}^{2}(xi-4) = 13$ is
   a. 8 b. 7 c. 13 d.-7
7. The matrix $A = \begin{pmatrix} 1 & 3 \\ 3 & 2 \end{pmatrix}$ is
   a. symmetric b. skew symmetric
   c. diagonal d. unit
8. The value of $\begin{vmatrix} 0 & 1 & 2 \\ 0 & 1 & 2 \\ 1 & 2 & 3 \end{vmatrix}$ is
   a. 0 b. 1 c. -1 d.2
9. The value of $(1-\omega)(1-\omega^2)$, where ω is the cube root of a complex number is
   a. 0 b. 1 c. 2 d. 3
10. The magnitude of 2-3i is
    a. $\sqrt{13}$ b. $\sqrt{5}$ c. 1 d.13
11. 1 and 2 are the roots of
    a. $x^2 - 3x + 2 = 0$ b. $x^2 + 3x + 2 = 0$
    c. $x^2 + x + 2 = 0$ d. $x^2 + 3x + 1 = 0$
12. The value of $\tan(\tan^{-1} 1)$ is
    a. 0 b. 1
    c. -1 d. $\sqrt{3}$
13. The solution of $cosx = \frac{1}{2}$ is
    a. $2n\pi$ b. $\frac{\pi}{3}$
    c. $2n\,\pi \pm \frac{\pi}{3}$ d. $2n\,\pi + \frac{\pi}{3}$
14. The length of the perpendicular from (0,0) to the line x + y + 1 = 0 is
    a. $\frac{1}{\sqrt{2}}$ b. $\sqrt{2}$
    c. $-\frac{1}{\sqrt{2}}$ d. $-\sqrt{2}$
15. The angle between the lines $2x^2 + xy - 2y^2 = 0$ is
    a. 0^0 b. 45^0 c. 135^0 d. 90^0
16. Center of the circle $x^2 + y^2 - 2x - 4y + 1 = 0$ is
    a. (1, 2) b. (0, 0)
    c. (2, 1) d. (2, 2)
17. Equation of tangent of the circle $x^2 + y^2 = 13$ at (2, 3) is
    a. $2x + 3y = 13$ b. x+2y = 13
    c. $2x + 3y = 10$ d. 2x+y =13
18. $\lim_{x\to 2} \frac{x^3-2^3}{x-2}$ is
    a. 12 b. 4 c. 9 d. 0/0
19. $\lim_{x\to 0} \frac{tanx-5x}{x}$ is equal to
    a. 6 b. -4 c. 0 d. 0/0
20. The function $f(x) = \begin{cases} x+2, & x \geq 2 \\ 2x, & x < 2 \end{cases}$ is continuous at
    a. x = 0 b. x = 2 c. x = -2 d. x= 1
21. If the derivative of $x^2 + 3x$ is 1, the value of x is
    a. 0 b. -1 c. 2 d. 5
22. If x = 2t + 1 and $y = t^2$, then dy/dt is
    a. t b. 1/t c. 2t d. 0
23. The points of inflection for the curve $x^3 + 4x$ is
    a. 0 b. 1 c. 6 d. -1
24. $2\int_0^1 xdx$ is equal to
    a. 0 b. 1 c. -1 d. 2
25. $\int cosx\, dx$ is equal to
    a. $sinx$ b. $-\frac{cosx}{2}$ c. $sin\frac{2x}{2}$ d. $2sin2x$

English (25 × 1 = 25)

26. .... his project was not completed, he was given permission to leave.
    a. although b. in spite of
    c. as it d. despite
27. Rajendra is ....hard working and friendly.
    a. but also b. both
    c. as well as d. not only
28. More than one hundred people ....to the meeting.
    a. have come b. has come
    c. is coming d. was coming
29. Mr. Thakuri speaks both Nepali .... Maithili very perfectly
    a. as well as b. and also
    c. and d. with
30. Reading, observing, teaching and ....are good ways to gain knowledge.
    a. discussion b. discussing
    c. to discuss d. discussing
31. The river Narayani flow through .... Narayanghat.
    a. an b. a c. the d. no article
32. In recent years people have been more concerned .... quality of drinking water.
    a. with b. for c. about d. of
33. She was killed .... a robber .... a gun.
    a. by ; for b. by ; with
    c. in ; for d. with ; for
34. The fear of rape and robbing .... caused many people run away from the cities.
    a. has b. have c. was d. has been
35. The grass needs ....
    a. cutting b. to cut
    c. to be cut d. both a and b
36. .... this evidence, I know, he is in the right.
    a. at b. by c. from d. in
37. I object ....your propose.
    a. at b. about c. in d. to
38. I have worked .... the answer.
    a. About b. over
    c. among d. out

39. Which word doesn't take ic...............suffix?
 a. history b. athlete
 c. artist d. success
40. Which of the following is a verb?
 a. spectacular b. marvel
 c. comparable d. peculiar
41. Which of the following does not take a prefix?
 a. provided b. poisonous
 c. protected d. detected
42. We shall finish the work before he ....
 a. will come b. would come
 c. could come d. comes
43. The memoranda .... Approved.
 a. is b. was
 c. has been d. have been
44. Which is incorrect?
 a. scissors b. tweezers
 c. forceps d. pincers
45. Lack of blood is ....
 a. amnesia b. insomnia
 c. anemia d. epicurean
46. A well experienced person is ....
 a. lawyer b. cosmopolitan
 c. veteran d. teacher
47. The doubt .... Gita will come.
 a. that b. if c. when d. why
48. They walk very <u>fast</u>. The underlined word is ....
 a. adverb b. adjective
 c. preposition d. demonstrative adjective
49. The passive of: They heard me sing a song.
 a. I was heard to sing a song.
 b. I was heard sing a song
 c. I was heard singing a song
 d. I was heard to sing a song by them.
50. The indirect of: He said, 'Congratulation'.
 a. He said that congratulations.
 b. He congratulated me.
 c. He congratulated that I passed.
 d. He said that I deserved congratulations.

Physics (25 × 1 = 25)

51. The duration in which the displacement becomes half the amplitude in the case of a simple harmonic motion if its period is 12 second, is
 a. 6 sec b. 3 sec c. 2 sec d. 1 sec
52. A train of length 600 m is travelling with a velocity of 64 km/hr. The time taken by the train to cross clearly a bridge of 1 km will be
 a. 1.5 sec b. 1.5 min c. 15 sec d. 15 min
53. Which one of the following pairs of physical quantities has the same dimension?
 a. Work and power b. Energy and power
 c. Work and energy
 d. Angular momentum and linear momentum
54. A body of mass 1 kg is rotated in a horizontal circle of radius 50 cm. If F and v represent the centripetal force and the constant speed respectively, which one of the following expressions may be correct?
 a. $v = \sqrt{F}$ b. $v = \sqrt{2F}$
 c. $v = \frac{1}{2}\sqrt{F}$ d. $V = \sqrt{\frac{F}{2}}$
55. The root mean square (rms) speed of hydrogen molecule at STP is 2 km per second. The rms speed of oxygen molecule at 810^0C is
 a. 2 kms^{-1} b. 1 $km\ s^{-1}$
 c. 0.5 kms^{-1} d. 4 kms^{-1}
56. Bolometer measures the
 a. coefficient of thermal conductivity
 b. thermo emf
 c. Specific heat d. heat radiation
57. A temperature of 14^0F is equivalent to
 a. 296 K b. 263 K
 c. 250 K d. $1.5^0\ C$
58. A myopic eye cannot see object beyond 1.5m. What power of lens will be required to correct this defect of vision?
 a. 1.5 D b. 0.66 D
 c. -1.5 D d. -0.66 D
59. The critical angle of glass water interface is
 a. $\sin^{-1}\left(\frac{8}{9}\right)$ b. $\sin^{-1}\left(\frac{4}{5}\right)$
 c. $\sin^{-1}\left(\frac{3}{4}\right)$ d. $\sin^{-1}(2/3)$
60. A diffraction grating has 5000 lines per cm. The maximum order visible with the radiation of wavelength 600nm in diffraction experiment is
 a. 2 b. 3 c. 4 d. 0
61. Light travels through a glass plate of thickness t and refractive index n. If C is the velocity of light in vacuum, the time taken by light to travel this thickness is
 a. $\frac{t}{nc}$ b. cnt c. $\frac{nt}{c}$ d. $\frac{tc}{n}$
62. Two charges of 2 μC and 4 μC are 1m apart. The electric field intensity is zero at a point between the charges. This point is approximately at a distance.
 a. 50 cm from 2 μC charge
 b. 59 cm from 2 μC charge
 c. 41 cm from 2 μC charge
 d. 66 cm from 2 μC charge
63. An open organ pipe can produce
 a. only odd harmonics
 b. only even harmonics
 c. both odd and even harmonics
 d. depends upon the length of pipe
64. Watt per ampere is the unit of
 a. electric potential b. electric field intensity
 c. electric power d. electric energy
65. Two wires A and B of equal radii are drawn from the same material. Their lengths are 1m and 2m respectively. The resistivity of A is
 a. less than that of B b. equal to that of B
 c. more than that of B
 d. depends upon the amount of current flowing in wires
66. When a capacitor is added in series in an LCR circuit, the impedance of the circuit
 a. increase b. decrease
 c. remains unchanged
 d. increases or decreases depending upon the frequency of a.c

67. A cell of $emf\ X$ if connected across a resistance R. The potential difference across the wire is measured as Y. The internal resistance of the cell should be
a. X – (Y/R) b. (X-Y)R
c. (X-Y)R/X d. (X-Y)R/Y
68. The ratio of wavelength of the first line of Lyman series to the first line of Balmer series is
a. 5:27 b. 20:27
c. 27:20 d. 1:4
69. If work function of a metal is 3.3 eV, the threshold frequency in photoelectric effect will be
a. $2\ x\ 10^{15}$ Hz b. $8\ x\ 10^{14}$ Hz
c. $4\ x\ 10^{16}$ Hz d. $6\ x\ 10^{17}$ Hz
70. A radioactive material of half life 5 days has its initial mass of 1 kg. The amount decayed after 20 days will be.
a. 125 g b. 250 g c. 550 g d. 937.5 g
71. A charged particle is undergoing a circular motion in a uniform magnetic field. The time period is independent of
a. speed b. mass
c. charge d. magnetic induction A
72. Velocity of sound in a gas is 330 ms^{-1} at STP. Its value at 300k will nearly be
a. 250 ms^{-1} b. 300 ms^{-1}
c. 360 ms^{-1} d. 450 ms^{-1}
73. Time of flight T of a projectile is related to the horizontal range R by an equation $gT^2 = 2R$. the angle of projection (in degrees) is
a. 90^0 b. 60^0 c. 45^0 d. 30^0
74. An electron in a field of 1 NC^{-1} will have an approximate acceleration.
a. $1.7\ x\ 10^{11}\ ms^{-2}$ b. $1\ x\ 10^{6}\ ms^{-2}$
c. $1\ x\ 10^{12}\ ms^{-2}$ d. $1\ x\ 10^{7}\ ms^{-2}$
75. A bullet gets heated if stopped by a target. If its velocity is doubled the rise in temperature of the bullet will be
a. same b. 2 times
c. 4 times d. 16 times

Chemistry (25 × 1 = 25)

76. Paraffins are also called
a. alkanes b. alkenes
c. alkynes d. ethylenes
77. A green color is formed in Lassaigne's test if nitrogen is present in an organic compound. This green color is due to the formation of
a. $Fe_4[Fe(CN)_6]_3$ b. $Fe(CNS)$
c. $Na_4[Fe(CN)_5NOS]$ d. $Na[Fe(CN)_6]$
78. Al_4C_3 reacts with water to give
a. C_2H_4 b. C_2H_2
c. H_2 d. CH_4
79. Aniline on warming with Benzaldehyde
a. acetanilide b. benzalinide
c. Schiff's base d. phenol
80. Which of the following compounds is used as the best anti-knocking agent?
a. Tetraethyl lead b. methane
c. methoxy propane d. methyl cyanide
81. Chloroform reacts with concentrated HNO3 on heating and yields
a. chloretone b. chloropicrin
c. carbon tetrachloride d. carbonyl chloride
82. Which of the following reagents is used to detect the aldehyde group?
a. Ninhydrin reagent b. Tollen's reagent
c. Grignard reagent d. Baeyer's reagent
83. Terylene is a
a. addition polymer b. condensation polymer
c. polyamide d. polyimide
84. The formula of Zinc blende is
a. $ZnCO_3$ b. ZnS
c. Zno d. $ZnO.Fe_2O_3$
85. The oxidation state of iron in Mohr's salt is
a. +2 b. +3 c. +1 d. 0
86. Which of the following oxides is acidic?
a. Feo b. CO_2 c. CO d. CaO
87. The structure of ammonia molecule is
a. V-shaped b. tetrahedral
c. linear d. trigonal pyramidal
88. Orthophosphoric acid is
a. monobasic acid b. dibasic acid
c. Tribasic acid d. tetrabasic acid
89. The formula of Epsom salt is
a. $MgSO_4.7H_2O$ b. Mgo
c. $CaSO_4.2H_2O$ d. CaO
90. Ostwald's process is used for the manufacture of
a. Sulphuric acid b. nitric acid
c. ammonia d. white phosphorus
91. Among the following elements, the one having highest electron affinity is
a. chlorine b. fluorine
c. iodine d. bromine
92. 44 gm of CO_2 is equal to
a. $6.023x10^{23}$ no of CO_2 molecule
b. $6.023x10^{21}$ no of CO_2 molecule
c. $6.023x10^{19}$ no of CO_2 molecule
d. $6.023x10^{18}$ no of CO_2 molecule
93. Equivalent weight of potassium dichromate in acidic medium is equal to
a. Mol. wt/1 b. Mol. wt/6
c. Mol. wt/3 d. Mol. wt/5
94. The weight of sodium carbonate required to prepare 100 mL of Deci normal sodium carbonate solution is
a. 0.53 gm b. 5.3 gm
c. 0.353 gm d. 5.6 gm
95. Which of the following is the unit of surface tension?
a. dynes.cm b. $dynes.cm^{-1}$
c. $dynes.cm^2$ d. $dynes.cm^{-2}$
96. Electrons will distribute themselves in degenerate orbitals so as to retain parallel spin as much as possible. This is called
a. Hund's rule b. Aufbau principle
c. Uncertainty principle
d. Paul's exclusion principle
97. The actual electronic configuration of copper is
a. $[Ar]4s^23d^8$ b. $[Ar]4s^13d^{10}$
c. $[Ar]4s^23d^{10}$ d. $[Ar]4s^23d^8$
Ans:- Cu lies in 29 number and Ar lies in 18 number and option b gives 29 on adding all electrons 18+1+10=29.

98. If the pH of a solution is 5.2, the hydrogen ion concentration of the solution is
    a. $6.3\ x\ 10^{-5}$ M b. $6.3\ x\ 10^{-6}$ M
    c. $6.3\ x\ 10^{-7}$ M d. $6.3\ x\ 10^{-4}$ M
    Ans: $[H^+]=10^{-PH} = 10^{-5.2}$ *calculate*
99. The unit of rate constant for first order reaction is
    a. sec^{-1} b. $mol\,\mathrm{sec}^{-1}$
    c. $mol^{-1}\mathrm{sec}^{-1}$ d. $litre^2 mol^{-2} s^{-1}$
100. The enthalpy of formation of the compound is
    a. always positive
    b. always negative
    c. can be positive or negative
    d. unpredictable

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Attempt all questions:

Mathematics (25 × 1 = 25)

1. If A and B are any two sets, then A – (A-B) is equal to
   a. B – A b. $A \cap B$ c. $A \cup B$ d. ϕ
2. The range of the function $y = \sqrt{(a^2 - x^2)}$, a>0 is equal to
   a. [-a,a] b. (-a, a. c. [0, a] d. (0, a)
3. What is the value of $\log_a \sqrt{a^3\sqrt{a^2}}$?
   a. 4 b. 3 c. 2 d. 1
4. If $A = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$, then A^{100} is equal to
   a. 1 b. 0 c. -1 d. None
5. If $a^x = b^y = c^z$ and a, b, c are in G.P. then x,y,z are in
   a. G.P. b. A.P. c. H.P. d. None
6. $\lim_{x \to 0} \frac{a^x - b^x}{x}$ is equal to
   a. 0 b. log (ab) c. log(a/b) d. log(b/a)
7. The derivative of $y = 5^x$ with respect to x is equal to
   a. $5^x \log_e 5$ b. 5^x
   c. log$e$ 5 d. 5log$e$ 5
8. The function $f(x) = x - \frac{1}{x^2}, x \in R , x \neq 0$ is
   a. $(-\infty, 0) \cup (0, \infty)$ b. $(-\infty, 0] \cup [0, \infty)$
   c. [-1, 1] d. (-∞, ∞)
9. The integral $\int \frac{e^x dx}{e^x+1}$ is equal to
   a. $\log(e^x + 1) + C$ b. $\frac{-1}{e^{2x}+1} + C$
   c. $\frac{-1}{2(e^x+e^{-x})} + C$ d. $\frac{-1}{2(e^{2x}+1)} + C$
10. For what value of k will the equation $5x^2 - kx + 45 = 0$ have equal roots?
    a. 0 b. ± 3
    c. ± 30 d. ± 33
11. The quadratic equation of whose one root is $(2 + \sqrt{3})$ is
    a. $x^2 + 4x + 1 = 0$ b. $x^2 - 4x + 1 = 0$
    c. $x^2 - 4x - 1 = 0$ d. $-x^2 - 4x - 1 = 0$
12. The distance between the parallel lines y – 2x = 4 and 6x – 3y = 5 is
    a. $\frac{1}{\sqrt{45}}$ b. $\frac{7}{\sqrt{45}}$
    c. $\frac{17}{\sqrt{45}}$ d. $\frac{17}{2\sqrt{45}}$
13. Radius of the circle $x^2 + y^2 - 3x + 2y - ¾ = 0$ is
    a. 2 b. 1 c. 4 d. 3
14. The absolute value of the complex number $(1 + i)^{-1}$ is
    a. 1 b. $\sqrt{2}$ c. $\frac{1}{\sqrt{2}}$ d. 2
15. If $z = cos\theta + isin\theta$ then $z^n + \frac{1}{z^n}$ is equal to
    a. $-2\ cosn\theta$ b. $2\ cosn\theta$
    c. $2\ sinn\theta$ d. $-2\sin n\theta$
16. The n^{th} term of the series: 2 + 6 + 12 + 20 + ……. is
    a. n(n+1) b. (n+1) (n+2)
    c. n(n-1) d. n

17. If $|x| < 1$ and $y = x + x^2 + x^3 + x^4 + \ldots\ldots + \infty$, then x is equal to
    a. $\frac{y}{1-y}$ b. $\frac{y}{y-1}$
    c. $\frac{(y+1)}{y}$ d. $\frac{y}{1+y}$
18. The derivative of $y = \cos(cos\sqrt{x})$ *is*
    a. $\frac{(\sin(cos\sqrt{x}).sin\sqrt{x}))}{2\sqrt{x}}$ b. $\sin(cos\sqrt{x})$
    c. $\sin(sin\sqrt{x})$ d. $\frac{\sin(cos\sqrt{x})}{2\sqrt{x}}$
19. $3\cos^{-1}x$ is equal to
    a. $\cos^{-1}(3x - 4x^2)$ b. $\cos^{-1}(4x^3 - 3x)$
    c. $\cos^{-1}(4x - 3x^3)$ d. $\cos^{-1}(3x^3 - 4x)$
20. Solution of $\tan ax = \cot bx$ is
    a. $\frac{2n+1}{a+b}.\frac{\pi}{4}$ b. $\frac{2n-1}{a-b}.\frac{\pi}{2}$
    c. $\frac{2n+1}{a+b}.\frac{\pi}{2}$ d. $\frac{\pi}{2}$
21. What is the value of $\begin{vmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{vmatrix}$, where ω is an imaginary cube root of unity?
    a. 1 b. 0 c. 3 d. 2
22. The single equation representing the pairs of lines y = x and y = -x is
    a. $y^2 - x^2 = 0$ b. y- x = 0
    c. x – y = 0 d. $x^2 + y^2 = 0$ Ans: (y+x)(y-x)=0 or $y^2 - x^2 = 0$
23. Let A = [-3, 2] and B = [2, 3] then A – B is equal to
    a. [-3, 3) b. [-3, 2)
    c. (-2, 2) d. (-2, 1)
24. If $\lim_{x\to 0^-} f(x) \neq \lim_{x\to 0^+} f(x)$,then f(x) is said to be an
    a. infinite discontinuity
    b. removable discontinuity
    c. jump discontinuity
    d. none
25. Which one of the following is the area enclosed by the curve y = 3x, the x-axis and the ordinate x = 0, x = 4?
    a. 12 b. 16 c. 20 d. 24

English (25 × 1 = 25)

26. Inscription on a tomb is called.........
    a. Epitaph b. cemetery
    c. Morgue d. demagogue
27. After he finished the exam, he .... to the teacher.
    a. Handed over it b. handed it over
    c. handed it out d. handed out it
28. Every week she .... her sister in her village to talk to her.
    a. Calls over b. calls on
    c. calls out d. calls up
29. He has a coat .... five pockets.
    a. of b. about
    c. with d. in
30. To hit below the belt means:
    a. to use force b. to use unfair means
    c. to use energy d. to use leather
31. I disapprove ....his cheating on the exam.
    a. of b. at c. in d. off
32. The lights were................because the room was bright.
    a. Put off b. take off
    c. Left off d. switched off
33. Which of the following is a noun?
    a. Thicken b. impoverish
    c. Mercantile d. mercy
34. Which of the underlined word is an adjective?
    a. Swimming is <u>good</u> for health.
    b. Students are walking on the <u>lawn.</u>
    c. <u>Many</u> people like smoking.
    d. She is taking <u>knitting</u> classes.
35. Which of the following is an active voice?
    a. This work will be finished.
    b. The suspect was seen.
    c. I know him.
    d. The letter was posted.
36. The memoranda..............approved
    a. have been b. has been
    c. was d. is
37. Which of the following takes a singular verb?
    a. police b. furniture
    c. families d. committees
38. Neither her nor they..........going to the college.
    a. is b. are c. has d. was
39. Which expression is incorrect?
    a. A pile of books b. A herd of cattle
    c. A herd of sheep d. A pack of wolves
40. They daren't go............?
    a. did they b. do they
    c. hasn't they d.. dare they
41. I am hungry and ....
    a. She is too b. they are so
    c. so aren't they d. they are too
42. Which word has the stress on the first syllable?
    a. Likelihood b. religious
    c. fantastic d. orthography
43. How many syllables does the word "economical" have?
    a. five b. four c. three d. six
44. The pair.......has the same pronunciation.
    a. pot, port b. so, sow
    c. pull, pool d. did, dead
45. The word " they" has the same initial consonant sound as the word..........
    a. day b. date c. thief d. that
46. A professional horse rider is called
    a. Jockey b. rider
    c. Coach d. horse courser
47. Give the opposite meaning of "appropriate".
    a. Inevitable b. likely
    c. unsuitable d. suitable
48. Select the right synonym to the word "sporadic".
    a. Occasional b. frequently
    c. continuously d. never ending
49. Which of the following is incorrectly punctuated?
    a. The teacher said, "Honesty is the best policy".
    b. He said to me "When did she come to the party"?
    c. The man received a gift, the women, a book.
    d. The man, whom he met, had excellent speech
50. The word "father" takes the suffix:
    a. ......is b...some c....ly d. ......y

Physics (25 × 1 = 25)

51. The dimensional formula for potential difference is
a. $[ML^2T^{-3}I^{-1}]$ b. $[ML^2T^{-3}I]$
c. $[ML^2T^3I^{-1}]$ d. $[ML^2T^{-2}I^{-2}]$
52. A stone is thrown vertically upward with a speed u from the top of a tower reaches the ground with a speed of 3u. The height of the tower is..............
a. $\frac{3u^2}{g}$ b. $\frac{4u^2}{g}$
c. $\frac{6u^2}{g}$ d. $\frac{9u^2}{g}$
53. The acceleration of a particle in SHM is.........
a. Always zero b. always constant
c. Maximum at extreme position
d. Maximum at the equilibrium position
54. An iron ball is heated. The percentage increase will be largest in...........
a. volume b. density
c. diameter d. surface area
55. Two wires A and B are of the same material. Their lengths are in the ratio of 1:2 and diameters are in the ratio of 2:1. If they are pulled by the same force, their increase in length will be in the ratio.
a. 2 : 1 b. 1 : 4 c. 1 : 8 d. 8 : 1
56. Water is flowing through a tube of non-uniform cross section. If the radius of the tube at the entrance and the exit is 3:2, then the ratio of velocity of liquid entering and leaving the tube is:
a. 8 : 27 b. 4 : 9 c. 9 : 4 d. 1 : 1
57. The thermodynamic process in which the pressure of the system remains constant is called..............
a. isothermal b. adiabatic
c. isochoric d. isobaric
58. 50 g of ice at -6°C is dropped into water at 0°C. how many grams of water freeze? Specific heat capacity of ice=$2000JKg^{-1}C^{-1}$.
a. 1.785 g b. 4.25 g
c. 3.16 g d. 9.33 g
59. The image of an object placed at the focus of a concave mirror is at
a. f b. Infinity c. 2f d. f/2
60. The temperature of source and sink of cannot engine are 400K and 300K respectively. What is its efficiency?
a. 100% b. 75% c. 33.3% d. 25%
61. The refractive index of air with respect to glass is 2/3.The refractive index of diamond with respect to air is 12/5 Then the refractive index of glass with respect to diamond will be......
a. 5/8 b. 8/9 c. 5/18 d. 18/5
62. The focal length of a double convex lens for which radius of curvature of each surface is R will be........(μ = 1.5)
a. R/2 b. R c. 2R d. 4R
63. Light of wave length 7200 Å in air has a wave length in glass equal to..........(Given refractive index of glass with respect to air = 1.5).
a. 7200 Å b. 4800 Å
c. 1080 Å d. 10800 Å
64. Three capacitors of capacitance 3μF, 9μF and 18μF are connected first in series and then I parallel. The ratio of C equivalent capacitance in two cases (Cs/Cp) will be
a. 1:15 b. 15:1 c. 1:1 d. 1:3
65. Three equal resistors each of resistance r are connected to form a triangle. The equivalent resistance across any two corners of the triangle is....
a. 2r b. r/3 c. 2r/3 d. 3r
66. The resistances of two lamps are in the ratio of 1:2. Their wattage will be in the ratio of
a. 1:2 b. 2:1 c. 4:1 d. 1:4
67. The energy stored in a 50mH inductor carrying a current of 4A is......
a. 0.1 J b. 0.4 J c. 0.3 J d. 0.01 J
68. The alternating current in an LCR circuit is maximum when
a. $X_L = 0$ b. $X_C = 0$
c. $X_L = X_C$ d.$\sqrt{X_L^2 + X_C^2} = 0$
69. A particle of mass 10^{-31}Kg is moving with a speed of $10^5 m/s$. The de Broglie wavelength of the particle is.....
a. 6.63×10^{-8} m b. 6.63 Å
c. 66.3 Å d. 6.63×10^{-7} m
70. Two waves of the same wavelength and amplitude interfere to give a minimum when their phase difference is
a. π b. π/2
c. 3π/2 d. 0
71. Hard X-rays as compared to soft X-rays have
a. Higher intensity b. lower frequency
c. Higher frequency d. higher speed
72. The mass of α-particle is
a. Equal to the mass of four protons
b. Equal to the mass of four neutrons
c. Equal to the masses of 2 protons and 2 neutrons
d. Less than the sum of masses of 2 protons and 2 neutrons
73. A common emitter transistor amplifier has a current gain of 50. If the load resistance is 4 KΩ and the input resistance is 500 Ω. The voltage gain of the amplifier is..........
a. 400 b. 6.2 c. 500 d. 300
74. A tube closed at one end has a length 1 meter. The air column in the pipe can resonate for sound of frequency.....(V = 320ms−1)
a. 166 Hz b. 249 Hz
c. 575 Hz d. 80 Hz
75. A displacement wave is represented by y = 0.25 sin(500t − 0.0025x), where y, t and x are in cm, second and meter respectively. The wave length of wave is.......
a. 20π m b. 40π m
c. 60π m d. 80π m

Chemistry (25 × 1 = 25)

76. The gas obtained by adding water on aluminum carbide is
a. Ethyne b. ethane c. methane d. ethane
Ans: Jump to 2069 old question
77. The mixture of HCl and $ZnCl_2$ is known as
a. Tollen's reagent b. Baeyer's reagent
c. Lucas reagent d. Nessler's reagent

78. The IUPAC name of n-valeric acid is
a. Pentanoic acid b. butanoic acid
c. Propanoic acid d. ethanoic acid
79. A blood red coloration of ferric sulphocyanide obtained by addition of ferric chloride in sodium extract confirms the presence of
a. Sulphur b. nitrogen
c. both a and b d. halogens
80. Which of the following compounds has highest boiling point?
a. CH_4 b. CH_3Cl
c. CH_3Br d. CH_3OH
81. The compound that undergoes Cannizzaro reaction is
a. CH_3COOH b. C_2H_5CHO
c. HCHO d. CH_3OCH_3
82. Benzene is converted to toluene by
a. Friedel Craft reaction b. Grignard reaction
c. Wurtz reaction d. Perkin reaction
83. The compound that gives positive carbylamines reaction is
a. $(CH_3)_2NH$ b. $(CH_3)_3N$
c. $(CH_3)_4N^+$ d. $(CH_3)NH_2$
84. Hematite is an ore of
a. Silver b. Iron c. Mercury d. Copper
85. Na_2O is a
a. Neutral oxide b. acidic oxide
c. Basic oxide d. amphoteric oxide
86. Which of the following elements has highest electro-negativity?
a. Bromine b. Iodine
c. Chlorine d. Fluorine
87. Zinc sulphate ($ZnSO_4.7H_2O$) is also called
a. White vitriol b. Green vitriol
c. Blue vitriol d. corrosive sublimate
88. Brass is an alloy of
a. Copper and Zinc b. Copper and Nickel
c. Copper and Tin d. Copper and Lead
89. The formula of dolomite is
a. $CaCO_3$ b. $CaCO_3.MgCO_3$
c. $CaSO_4.2H_2O$ d. CaF_2
90. The general electronic configuration of zinc is
a. $[Ar]4s^23d^{10}$ b. $[Ar]4s^13d^{10}$
c. $[Ar]4s^23d^8$ d. $[Ar]4s^23d^7$
91. Equivalent weight of $KMnO_4$ in neutral medium is
a. 52.6 b. 158.0 c. 31.6 d. 63.0
92. Bohr's model was modified by
a. Rutherford b. Somerfield
c. Dalton d. Pauli
93. How many Oxygen atoms are there in 8.0g of oxygen atoms?
a. 3.011×10^{23} $atoms$ b. 3.011×10^{22} $atoms$
c. 3.011×10^{20} $atoms$ d. 3.011×10^{19} $atoms$
94. What is the pH of 0.001 M HCl?
a. 2.0 b. 3.0 c. 4.0 d. 5.0
95. The rate of reaction is independent of
a. Temperature b. concentration
c. Particle size of reactant
d. Molecularity
96. The CGS unit of specific conductance is
a. $Siemen\ cm^{-1}$ b. $ohm^{-1}cm^2equiv^{-1}$
c. Siemen d. ohm^{-1}
97. Hess's law deals with
a. Total change in heat of reaction
b. Rate of reaction
c. Equilibrium constant of reaction
d. Influence on pressure of volume of gas
98. The degree of dissociation of an electrolyte
a. Decreases with dilution
b. Increases with dilution
c. May increase or decrease with dilution
d. Is not affected by dilution
99. The weight of 100 ml of NH3 gas at NTP is
a. 0.0759 g b. 0.0579 g
c. 0.0459 g d. 0.0359 g
100. The law of multiple proportions was given by
a. Richter b. John Dalton
c. Albert Einstein d. Gay Lussac

Tribhuvan University
Institute of Science and Technology
4 Years Bachelor in Computer Science and Information Technology (BSc. CSIT)
Entrance Examination 2071

Full Marks: 100
Time: 2 hrs.

Attempt all questions:

Mathematics ($25 \times 1 = 25$)

1. If $|x-3| = 4$ then x is
   a. 7 and -1 b. 7 and 1 c. 7 d. 1
2. If $\{x - x^2 = 9$ and $2x = 6\}$,then
   a. null set b. {3}
   c. {3, -3} d. {4, 3}
3. If f: R →R defined by $f(x) = x^2 + 3$ then $f^{-1}(4)$is
   a. 0 b. {-1,1} c. {1,0} d. {4,3}
4. The value of $\log_2 \sqrt{2} + \log_3 \sqrt{3} + \log_4 \sqrt{4}$ is
   a. 0 b. $\frac{3}{2}$ c. $-\frac{13}{12}$ d. $\frac{\pi}{6}$
5. If $\cos^2 \theta = \frac{1}{2}$, then θ is
   a. $n\pi \pm \frac{\pi}{4}$ b. $n\pi + \frac{\pi}{4}$
   c. $n\pi \pm \frac{\pi}{3}$ d. $2n\pi$
6. $cos\left(\sin^{-1}\frac{3}{5}\right) =$
   a. $\frac{3}{5}$ b. $\frac{4}{5}$ c. $\frac{9}{25}$ d. $\frac{4}{25}$
7. If a^2, b^2, c^2 are in H.P. then
   a. $2a^2c^2 = b^2(a^2 + c^2)$
   b. $a^2c^2 = b^2(a^2 + c^2)$
   c. $2b^2c^2 = a^2(b^2 + c^2)$
   d. $c^2a^2 = 2b^2(a^2 + c^2)$
8. If $A = \begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}$ and $A^2 - nA - I = 0$,then the value of n is
   a. 0 b. 4 c. 1 d. -4
9. If $A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \end{bmatrix}$, then A is
   a. Symmetric b. Skew-symmetric
   c. Singular d. Nonsingular
10. The system of equations $2x + y = 5$; $4x + 2y = 8$ is
   a. Consistent and dependent
   b. Inconsistent and independent
   c. Inconsistent and dependent
   d. Consistent and independent
11. The value of $i^7 + \frac{1}{i^4}$ is
   a. 1 b. -1 c. – i d. -i+1
12. The value of $\frac{x+wy+w^2z}{y+wz+w^2x}$,where w is the cube root of unity, is
   a. w b. $x + y + z$ c. w^2 d. 1
13. If the roots of $x^2 + 4x + k = 0$,are equal then k is
   a. 0 b. 4 c. 16 d. -4
14. The two lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are identical if
   a. $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ b. $\frac{a_1}{a_2} = 0$
   c. $\frac{b_1}{b_2} = 0$ d. $\frac{c_1}{c_2} = 0$
15. The two lines $2x^2 - 2xy + ky^2 = 0$ are perpendicular to each other if k is
   a. 2 b. -2 c. 0 d. 1
16. The equation of the circle touching the positive x-axis and y-axis with radius 2 units is
   a. $x^2 + y^2 - 4x - 4y + 4 = 0$
   b. $x^2 + y^2 + 4x + 4y + 4 = 0$
   c. $x^2 + y^2 - 4x + 4y + 4 = 0$
   d. $x^2 + y^2 - 4x + 4y - 4 = 0$
17. If the line $3x + 4y = k$ is tangent to the circle $x^2 + y^2 = 25$ at (3,4) then k is
   a. 25 b. -25 c. ±25 d. ±1
18. The value of $\lim_{x\to 2} \frac{x^5-2^5}{x-2}$ is
   a. 80 b. 40 c. 10 d. 0
19. The value of $\lim_{x\to 0} \frac{(3x+4tan2x)}{x}$ is
   a. 7 b. 3 c. 11 d. 4
20. The derivative of $y = b^x$ is
   a. xb^{x-1} b. b c. $x^b \ln|b|$ d. $b^x \ln|b|$
21. The derivative of $y = \cos(cos\sqrt{x})$ is
   a. $\frac{(\sin(cos\sqrt{x}).sin\sqrt{x}))}{2\sqrt{x}}$ b. $\sin(cos\sqrt{x})$c.
   c. $\sin(sin\sqrt{x})$ d. $\frac{\sin(cos\sqrt{x})}{2\sqrt{x}}$
22. The value of x for which the derivative of $x^2 + 2x + 2$ is zero is
   a. 1 b. 2 c. 0 d. -1
23. The point of inflection of the curve $x^3 + 3x^2 - 9x + 2$ is
   a. -1 b. 1 c. 6 d. 0
24. $\int \frac{dx}{1-cosx} =$
   a. $tan\frac{x}{2}$ b. $-\cot\frac{x}{2}$
   c. $\cos\frac{x}{2}$ d. $-\tan\frac{x}{2}$
25. $\int_0^{\frac{\pi}{2}} \frac{cosx}{1+sinx}\, dx =$
   a. ∞ b. ln |2| c. 0 d. 1

English ($25 \times 1 = 25$)

26. The word "education" has the stress on the .... syllable.
   a. first b. second
   c. third d. fourth
27. Select the right synonym to the word "ardous"
   a. Simple b. Difficult
   c. easy d. strange
28. Give the opposite meaning of "obscure"
   a. Pedantic b. implicit
   c. Explicit d. obnoxious
29. The initial consonant sound of "chef" is the same as that of .....
   a. Chute b. chess
   c. child d. cheap
30. Which of the following pair has the same vowel sound?
   a. Hut/hot b. sit/seat
   c. salt/mark d. pair/tear
31. I completely differ .... you .... this point.
   a. From: at b. from: in
   c. from: on d. to: at
32. We feel sympathy .... the poor.
   a. To b. with c. about d. for
33. He insisted ....leaving immediately.
   a. at b. in c. on d. over

34. Tick the correct word to the underlined expression. No one knows his hole and corner method of dealing with people.
    a. strict b. secret
    c. servile d. suspicious
35. Food that agree to one's taste is ....
    a. Pungent b. edible
    c. palatable d. sensuous
36. The word "pleased" takes the prefix ....
    a. un- b. mis- c. dis- d. none-
37. One who is present everywhere is............
    a. omnipresent b. omniscient
    c. theist d. omnipotent
38. Fear of food is called as ......
    a. Cibphobia b. ergophobia
    c. Panthophobia d. hyctophobia
39. A funeral bell is called
    a. Call b. knell
    c. replica d. invitation
40. People ...... a large number of computers now, because prices are getting low
    a. Must buy b. must have bought
    c. must be buying d. must buying
41. Although they are similar, chipmunks are .... most other ground squirrels.
    a. Alike b. like as
    c. like to d. like
42. She ....the whole day long.
    a. has been working b. works
    c. had worked d. worked
43. Now a days Shyam is .... busy to take care of his health.
    a. very b. to c. so d. extremely
44. She demanded .... her status.
    a. know b. knowing
    c. to know d. to be known
45. The mail comes at ten O'clock everyday .... Saturday.
    a. But also b. and c. also d. but
46. In my office, salary is paid by .... month.
    a. the b. a c. an d. some
47. Every boy and every girl .... very responsible.
    a. are b. is c. has d. have
48. Which of the following is accepted?
    a. Some of rice is still left.
    b. Time and tide wait for none.
    c. She absents herself from the college today.
    d. None of the squares was properly drawn.
49. Which of the following is a complex sentence?
    a. However, hard she worked, she failed in the exams.
    b. It rained heavily, however he came to school.
    c. In spite of heavy rain, he come to school
    d. Neither she nor he will come.
50. Which of the following is an adjective?
    a. Sympathize b. lighten
    c. Perception d. moral

Physics (25 × 1 = 25)

51. The dimensions of (h/e) are same as that of
    a. Magnetic field b. electric field
    c. Magnetic flux d. electric flux
52. The number of significant figures in $0.0030 \times 10^{11} m$ are
    a. 5 b. 4 c. 11 d. 2
53. μ_s and μ_k are coefficient of static and kinetic frictions between two bodies. Then
    a. $\mu_s \geq \mu_k$ b. $\mu_s < \mu_k$
    c. $\mu_s = 0$ *and* $\mu_k > 0$ d. $\mu_s < 0$ and $\mu_k < 0$
54. When a torque acts on a body, the change in angular momentum of the body is
    a. Perpendicular to L b. parallel to L
    c. Always zero d. $180° L$
55. The Poisson's ratio of material can't be
    a. 0.10 b. 0.20 c. 0.40 d. 0.65
56. The depth of water at which air-bubble of radius 0.4 mm may remain in equilibrium (surface tension of water = $72 \times 10^{-3} \frac{N}{m}$, g= $9.8 \frac{m}{s^2}$) is given by
    a. 7.348 cm b. 0.918 cm
    c. 3.674 cm d. 1.837 cm
57. When a cylinder is heated, its length increases by 2%, the area of its base will increase by:
    a. 0.5% b. 1% c. 2% d. 4%
58. In a pressure cooker food is cooked usually at a pressure
    a. One atmosphere b. half atmosphere
    c. Two atmosphere d. 50 atmosphere
59. The mean free path of a gas varies with absolute temperature (T) as
    a. T^4 b. $1/T^4$ c. $1/T$ d. T
60. The efficiency of Carnot engine working between steam point and ice point is:
    a. 16.8% b. 26.81% c. 36.8% d. 46.8%
61. The bending of sound waves through the corners of the obstacle is called
    a. Refraction b. interference
    c. Beats d. diffraction
62. When a tuning fork is vibrated its prongs have a phase difference of:
    a. 0 b. $\pi/4$ **c. π** d. 2π
63. The image of an object placed at the focus of convex mirror is at a distance
    a. ∞ b. f c. 2f d. f/2
64. If sky is seen from moon's surface, it will appear
    a. Black b. Blue c. White d. Red
65. A double convex air bubble in a glass sheet would behave as a
    a. Convergent lens b. concave mirror
    c. Divergent lens d. plane mirror
66. When two prisms are combined it gives
    a. Reflection only b. lateral Shift
    c. Dispersion and derivation both
    d. Dispersion or deviation
67. Which property of electrons is used in an electron microscope?
    a. Negative charge b. wave nature
    c. Spin d. small size
68. A system of three charges may be in equilibrium. If they are placed
    a. On a straight line
    b. On corners of equilateral triangle
    c. On three corners of a rectangle

d. On the corners of a cube

69. The radius of Earth is 6400 km. The capacitance is:
a. 6400 MF b. 6400 F
c. 1 F d. 711 μF

70. Two wires of same material have lengths L and 2L and cross reaction areas 4A and A respectively. The ratio of their specific resistances would be
a. 1:1 b. 1:8 c. 8:1 d. 1:2

71. The magnetic field induction inside a long solenoid is
a. zero b. $2\mu_0 ni$ c. $\mu_0 ni$ d. μni

72. Electrons in the atoms are held due to
a. Nuclear forces b. Coulomb forces
c. Van der Waals force d. Gravitational forces

73. Which series of H atom lies in visible region?
a. Lyman b. Bracket and Paschen
c. Balmer d. Paschen

74. The half-life of a substance is 1600 years. The mean life is
a. 1600 yrs b. 3200 yrs
c. 800 yrs d. 2309 yrs

75. Rydberg constant is
a. Same for all elements
b. Different for different elements
c. A universal constant
d. Is different for lighter elements but same for heavier elements.

Chemistry (25 × 1 = 25)

76. How many orbitals are possible for principle quantum number 3?
a. 3 b. 4 c. 6 d. 9
There are 3 subshells for n=3 s,p and d so s contains 1 orbital p contains 3 and d contains 5 orbitals so total number of orbitals =9

77. The number of moles of water present in 18g of water is
a. 18 b. 1 c. 1.8 d. 180

78. The half-life of an radioisotope is 30 minutes. After how much time the amount of radioisotope left is 1/4th of the original amount?
a. 4 minutes b. 30 minutes
c. 60 minutes d. 120 minutes

79. What is oxidation of chlorine in HOCl?
a. +1 b. 0 c. -1 d. +3

80. Hemoglobin contains 0.33% of iron by weight. Molecular weight of hemoglobin is 67200. The number of iron atoms (At wt of Fe = 55.85) in one molecule of hemoglobin is
a. 2 b. 4 c. 6 d. 8

81. The gas law which deals with the effect of pressure in a given volume of gas at constant temperature is known as
a. Boyle's Law b. Charles's Law
c. Graham's Law d. Dalton's Law

82. Electronic configuration of four elements A, B, C, D are as follow, which will be most metallic?
a. A=2, 8,4 b. B=2,8,8
c. C=2,8,1 d. D=2,8,7

83. In which of the following compound the molecular geometry cannot be predicted by the use of VSEPR theory?
a. C_2H_6 b. H_2O c. CH_4 d. NH_3

84. Consider the reaction 2A +B →C + D. If the concentration of the reactants are increase by three times, the rate of reaction will increase by.
a. 3 times b. 6 times
c. 9 times d. 27 times

85. An aqueous solution of NaCl would be
a. Acidic b. Basic
c. Neutral d. None
d. could be acidic or basic depending upon temperature

86. The pH of pure water at 50°C would be
a. 7.0 b. >7.0
c. <7.0 d. cannot be predicted

87. Which of the following metals generate H2 on treatment with dil.HNO3?
a. Zn b. Mn c. Cu d. Pb

88. 1 M H_2SO_4 is equal to
a. $1N\ H_2SO_4$ b. $2N\ H_2SO_4$
c. $0.5N\ H_2SO_4$ d. $4N\ H_2SO_4$

89. Hydrogen molecule which has parallel spin of two nuclei is called
a. Ortho hydrogen b. para hydrogen
c. heavy hydrogen d. nascent hydrogen
Ortho hydrogen spins are in the same direction where as in para hydrogen spins ae in the opposite direction

90. Ammonia is manufactured by the use of
a. Solvay's process b. Haber's process
c. Ostwald's process d. Down's process

91. Haematite is an ore of
a. Fe b. Cu c. Zn d. Hg

92. Which of the following is not a nucleophile?
a. BF_3 b. NH_3 c. H_2O d. OH^-

93. Anti-Markovnikoff addition of HBr is observed in
a. Propene b. 1-Butane
c. 2-Butene d. Pent-2-one

94. When oxalic acid crystals and glycerol are mixed and heated to about 110°C, the compound obtained is
a. Chloroform b. diethyl ether
c. acetone d. formic acid

95. Which of the following is a meta directing group?
a. –NH2 b. –OH c. –COOH d. -R

96. How many position isomers are possible for dichlorobenzene?
a. 2 b. 3 c. 4 d. 6

97. Which one of the following is a condensation polymer?
a. Polyethene b. Terylene
c. PVC d. Teflon

98. Penicillin is an example of
a. Antiseptic drug b. Antipyretic drug
c. Antibiotic drug d. Analgesic drug

99. Enzymes are
a. Carbohydrates b. Protein
c. Lipids d. Nucleic acids

100. Which base is found only in the nucleotides of RNA?
a. Adenine b. Guanine
c. Uracil d. Cytosine

Tribhuvan University
Institute of Science and Technology
4 Years Bachelor in Computer Science and Information Technology (B. Sc. CSIT)
Entrance Examination 2072

Full Marks: 100
Time: 2 hrs.

Attempt all questions:

Mathematics (25 × 1 = 25)

1. If a, b £ R, a/b is indeterminate, if
a. $a = 0, b \neq 0$ b. $a = 0, b = 0$
c. $a \neq 0, b \neq 0$ d. $a \neq 0, b = 0$
2. $(-\infty, \infty) =$
a. $\{x: -\infty \leq x \leq \infty\}$ b. $\{x: -\infty < x < 0\}$
c. $\{x: -\infty < x < \infty\}$ d. $\{x: x \geq 0\}$
3. The statement is
a. Bagmati is a River. b. $x > 0$
c. How old are you? d. $y > 0$
4. If (2x-1, -3) = (3, y+3), then
a. x = 1, y = 0 b. x= - 1, y = - 3
c. x = 2, y = - 6 d. x = 0, y = - 1
5. If f: R → R is defined by f(x) = x and g: R → R is defined by g(x) = x then (f o g) (x) is
a. x b. x^2 c. $\frac{1}{x^2}$ d. 1/x
6. If Sin2x = 1, then x is
a. π/2 b. ± 1 c. - π/2 d. $n\pi + (-1)^n \frac{\pi}{4}$
7. The value of $Sin(\tan^{-1} x)$ is
a. x b. $\frac{x}{\sqrt{1+x^2}}$
c. $\frac{1}{\sqrt{1+x^2}}$ d. $\frac{x}{\sqrt{1-x^2}}$
8. If 2p, p+8, 3p+1 are in A.P., then p is
a. 5 b. 3 c. 7 d. -5
9. A, G and H are arithmetic mean, geometric mean and harmonic means respectively then
a. $A^2 = GH$ b. $H^2 = AG$
c. G= AH d. $G^2 = AH$
10. If $A = (-1\ 0\ 2)$ and $B = \begin{pmatrix} 2 \\ 3 \\ 4 \end{pmatrix}$, then AB is
a. (6) b. 0 c. (-2 0 8) d. (2 0 - 4)
11. The value of the determinant $\begin{vmatrix} 1 & 2 & 0 \\ 2 & 4 & 1 \\ 3 & 6 & 2 \end{vmatrix}$ is
a. 1 b. 3 c. 0 d. 4
12. The adjoint of the matrix $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ is
a. $\begin{pmatrix} a & d \\ b & c \end{pmatrix}$ b. $\begin{pmatrix} a & b \\ d & c \end{pmatrix}$
c. $\begin{pmatrix} a & d \\ c & b \end{pmatrix}$ d. $\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$
13. The real part of is $\frac{(1+i)^2}{2-i}$
a. -2/5 b. 2/5 c. 1/5 d. 1
14. If ω be the cube roots of unity then $(1 + \omega + \omega^2)(1 + \omega - \omega^2) =$
a. 0 b. 2 c. 4 d. 3
15. The value of k for which the equation $x^2 + 2(k + 2)x + 9k = 0$ has equal roots are
a. 4, 1 b. −4, −1 c. −4, 1 d. 4, −1
16. The distance between the point (1, 2) and the line $3x + 4y - 7 = 0$ is
a. 4 b. 5 c. 4/5 d. -4/5
17. The two lines represented by $ax^2 + 2hxy + by^2 = 0$ are coincident if
a. $h^2 = ab$ b. $h^2 > ab$
c. $h^2 < ab$ d. $h^2 > 0$
18. The equation of tangent to the circle $x^2 + y^2 = 5$ at (2, 1) is
a. x + y = 5 b. x - y = 5
c. 2 x + y = 5 d. x + 2y = 5
19. $\lim_{x-2} \frac{x-2}{\sqrt{x^2-4}}$
a. 0/0 b. 0 c. 1 d. 4
20. $\lim_{x-0} \frac{1-\cos ax}{x^2}$
a. 0 b. $\frac{a^2}{2}$ c. $2a^2$ d. 2
21. The value of x for which the function $y = x^3 - x^2$ has $\frac{dy}{dx} = 0$
a. 0, 2/3 b. 2/3 c. 0 d. - 2/3
22. The point of inflection for $y = x^2 - 2x$ is
a. 0 b. does not exist c. 2 d. 1
23. $\int_0^1 \frac{2x dx}{\sqrt{1-x^2}}$
a. 1/2 b. 1 c. 0 d. 2
Ans: put $y = 1 - x^2$ or $dy = -2x.dx$ or
24. $\int x \sin x \, dx =$
a. $Sinx - x\,Cosx + C$
b. $Sinx + x\,Cosx + C$
c. $Cosx + x\,Sinx + C$
d. $-Sinx + x\,Cosx + C$
25. Area bounded by the x-axis and the curve $y = 3x^2$ and the ordinate of x = 3 and x = 4 is
a. 37 b. 8 c. 19 d. 0

English (25 × 1 = 25)

26. Which of the following pair has the same vowel sound?
a. pair, tear b. hut, but
c. seat, sit d. salt, mark
27. The sentence “I saw a black bird” has a tone.
a. rising b. falling
c. fall-rise d. fall-fall
28. The word "joy" has the same initial consonant sound as the word
a. zoo b. gig c. gesture d. game
29. How many syllables does the word "pleasurable" have?
a. Three b. two c. four d. one
30. One who knows everything is.
a. omnipresent b. omnipotent
c. Fatalist d. omniscient
31. Select the right synonym to the word "aspiration"
a. Apathy b. yearning
c. Haughty d. soothe
32. Give the opposite meaning of "hypocrisy".
a. Majority b. jolly
c. Sincerity d. praise
33. He died ……… neglect but she died ………… a train accident.
a. through, in b. in, through
c. of, of d. of, in
34. Who did you go………….. ?
a. to b. with c. at d. for

35. Insert the missing vowel in these words : defin_te, po_gnant, exist_nce
a. e-i-e b. a-i-e c. i-e-a d. e-e-e
36. The plane flew .... my head.
a. under b. through c. on d. over
37. You and I ..... working.
a. are b. is c. am d. has
38. Choose the correct meaning to the underlined expression. He has turned the table on his enemy.
a. hit b. joy
c. change the possible defeat into a victory
d. run
39. Opposed to great or sudden change is called
a. static b. conservative
c. evolutionary d. revolutionary
40. Greed is terrible.
a. sin b. crime c. vice d. mistake
41. The gun .... by mistake.
a. went off b. gave off c. gave out d. hit on
42. She has .... down for a rest.
a. laid b. lied c. lay d. lain
43. The word "brother" takes the suffix .
a. - ish b. -ly c. -some d. -y
44. The word "desirable" takes the -prefix.
a. un- b. mis- c. dis- d. non-
45. English teacher makes her class interesting. It is
a. Adjunct b. Complement
c. Direct object d. Indirect object
46. Which is the correct expression?
a. today afternoon b. this evening
c. the backside of a building
d. a worth seeing sight
47. She beckoned to enter the room. It means she
a. told b. said c. signaled d. advised
48. The fear of blood is called.
a. chirophobia b. ergophobia
c. monomania d. hematophobia
49. He has _____friends because of his short temperament.
a. few b. a few c. lot of d. a lot of
50. Which of the following is a passive sentence?
a. I like people loving me.
b. I found him driving my car.
c. I hate having my hair style criticized.
d. I don't mind people criticizing my work.

Physics (25 × 1 = 25)

51. A force F = (2 i + 3 j - 4 k) Newton acts on a body. In 5 seconds the force displaces the body through a displacement s = (3 i + 2j - 2 k) meter. The power (in watt) of the force is
a. 4 b. 3 c. 5 d. 6
52. Two simple harmonic waves are represented respectively by y1= A1 Sin wt and $y2 = A_2 Cos\ wt$. The phase difference between the two waves is
a. 3π/2 b. π c. π/2 d. π/4
53. A river is flowing west to east at a speed of 5 m/min. A man on the south bank of the river, capable of swimming at 10m/min in still water, wants to swim across the river by the shortest path. He should swim in the direction
a. due North b. 30° East of North
c. 60° East of North d. 30° West of North
54. Dimension of surface energy is
a. $[M^1L^0T^{-2}]$ b. $[M^1L^2T^{-2}]$
c. $[M^0L^1T^{-2}]$ d. $[M^2L^0T^{-2}]$
55. The terminal velocity of a small sized spherical body of radius r falling vertically in a viscous liquid is given as one of the following proportionality with radius.
a. r^{-2} b. r^{-1} c. r d. r^2
56. A constant torque acting on a uniform circular wheel changes its angular momentum from L_0 to $4L_0$ in 4 seconds. The magnitude of this torque is
a. $\left(\frac{3}{4}\right)L_0$ b. L_0 c. $4L_0$ d. $12L_0$
57. At what temperature the rms velocity of a hydrogen molecule be equal to that of oxygen at 47^0C?
a. - 273° C b. 273 K c. 20 K d. 20°C
58. Dimension of the change in entropy is
a. $[M^1L^2T^{-2}K^{-1}]$ b. $[M^1L^1T^2K^{-2}]$
c. $[M^1L^2T^{-2}]$ d. $[M^0L^2T^{-2}K^{-1}]$
59. A square plate of side 2 units is heated through 10° C. If the linear expansivity of the material is x, increase in the surface area of the plate is
a. 480 x b. 80 x c. 240 x d. 240 x^2
60. A black body radiates heat energy at the rate of 2 x 10^5 Js m' at a temperature of 127° C. The temperature of the black body at which the rate of heat radiation is $32\ x\ 10^5\ Js^{-1}\ m^2$ is
a. 327° C b. 927°C c. 527° C d. 727° C
61. A ray of light in air enters a glass slab. Its
a. wave length decreases
b. wave length increases
c. speed increases
d. frequency decreases
62. By using white light in double slit interference experiment the central fringe is white. What color of fringe can be seen nearest to the central fringe?
a. blue b. green c. red d. violet
63. A convex lens is immersed in water. Compared to its power in air, the power in water will
a. Increase for red and decrease for blue
b. Decrease for all colors
c. be same for all colors
d. Increase for all colors
64. Two vehicles are approaching each other with a speed of 10ms-1. If A emits a note of 1000 vibrations, what will be the frequency of the note as heard by a person sitting in B if the velocity of sound is 330 ms-1?
a. 950 Hz b. 1000 Hz
c. 1062.5 Hz d. 1215.5 Hz
65. An open pipe and a closed pipe resonate to the same tuning fork. The ratio of their lengths is
a. 1:1 b. 2:1 c. 1:2 d. 4:1
66. The radius of a copper wire carrying a current is doubled, the drift velocity of electrons will
a. Remains same b. increases four times
c. Decreases four times
d. Increases first and then decreases

67. A 25 W, 120 V lamp and 100 W, 120 V lamp are connected in series across a 120 V line. Which lamp will burn more brightly?
a. 25 W, 120 V b. 100W, 120 V
c. Both will have same brightness.
d. Alternatively both may be bright, one at a time.
68. A Spherical condenser of 1 Farad will have the dimension of
a. a small metallic ball of radius 0.04 m
b. a big metallic ball of radius 100m
c. radius of earth whose radius is $6.4 \times 10^6\ m$
d. a sphere having radius of more than that of earth
69. The ratio of induced emf in a coil having 50 turns and rotating with 50 Hz to that of induced emf in a coil having 100 turns and rotating with 150 Hz in the same magnetic field is
a. 1:2 b. 2:3 c. 1:6 d. 3:2
70. A galvanometer (0-100) mA of resistance 1 Ω. is to be converted to an ammeter in the range 0-1 A. We have to use a shunt
a. 1 Ω b. 0.1 Ω c. 0.111 Ω d. 0.055 Ω
71. The ratio of specific charge of a proton to that of an alpha particle is
a. 1:4 b. 1:2 c. 4:1 d. 2:1
72. The angular momentum of electron in the hydrogen atom in the ground state is
a. h/2π b. h/4π c. h d. 2h
73. The approximate radius of aluminum nucleus (Al) is
a. 1.5 Fermi b. 2.5 Fermi
c. 4.5 Fermi d. 13.5 Fermi
74. The kinetic energy of a particle is doubled, de Broglie wavelength becomes
a. 2 times b. 4 times
c. 2 times d. 1/ √2 times
75. Half-life and mean life of a radioactive element are related. Choose correct answer from the following:
a. half-life is less than the mean life
b. half-life is more than the mean life
c. mean life and the half-life are the same
d. mean life is exactly two times the half life

Chemistry (25×1 = 25)

76. The number of moles present in 90 g of water is
a. 1.0 b. 90.0 c. 5.0 d. 9.0
77. 1.0 g of HCl reacts with 1.0 g of $CaCO_3$, the volume of CO2 produced at NTP would be equal to
a. 1.0 liters b. 0.224 liters
c. 2.24 liters d. 22.4 liters
78. Magnetic quantum number specifies
a. Orientation of orbitals
b. size of orbitals
c. shape of orbitals
d. magnetic properties of orbitals
79. A cooking gas cylinder can withstand a pressure of 20 atmosphere. At 27^0C the pressure of the containing gas is 10 atmosphere. On raising the temperature, the cylinder will burst when the temperature exceeds
a. 273° C b. 327° C c. 300° C d. 127° C
80. Which of the following methods of expressing concentration is independent of temperature
a. Molality b. Molarity
c. Normality d. Grams per liter
81. An aqueous solution of Na_2CO_3 would be
a. Acidic b. basic
c. neutral d. either acidic or basic
82. Which one of the following is not a Lewis base?
a. H_2O b. NH_3 c. OH^- d. BF_3
83. In alkaline condition $KMnO_4$ reacts as follow $2KMnO_4 + 2KOH \rightarrow 2K_2MnO_4 + H_2O + O$, the Eq. wt. of $KMnO_4$ is
a. M/1 b. M/2 c. M/5 d. M/6
84. The molecular geometry of which compound cannot be predicted by the application of VSEPR theory.
a. CH_4 b. PCl_5 c. SF_6 d. $MgCl_2$
85. Which of the following is an amphoteric oxide
a. ZnO b. MgO c. SiO_2 d. H_2O
86. Ammonia is manufactured by the use of
a. Down's Process b. Solvay's Process
c. Haber's Process d. Ostwald's Process
87. Dry ice is
a. Ice which is dried by treating with dehydrating agent
b. ice which is super cooled
c. Solid CO_2
d. ice mixed with some organic solvents
88. Number of atoms in one molecule of sulfur is
a. 8 b. 4 c. 2 d. 1
89. Which of the following noble gas is not present in atmosphere?
a. He b. Ar c. Ne d. Rn
90. Chalcopyrite is an ore of
a. Fe b. Cu c. Zn d. Hg
Ans: Study in detail about the ores of different metals
91. The substance used as flux in the extraction of iron from hematite in blast furnace is
a. Calcium phosphate b. Silica
c. Limestone d. Calcium silicate
92. The formula of bleaching powder is
a. Ca(OCl)Cl b. $CaSO_4.2H_2O$
c. $2CaSO_4.H_2O$ d. $MgSO_4.7H_2O$
93. The members of a homologous series have
a. different general formula
b. different molecular weight
c. different chemical properties
d. different method of preparation
94. Which of the following reagent cannot be used to distinguish between acetaldehyde and acetone
a. Tollen's reagent b. Fehling's solution
c. Schiff s reagent d. Br_2 in CCl_4
95. Reduction of nitrobenzene in acidic medium gives
a. aniline b. azoxybenzene
c. azobenzene d. hydrazobenzene
96. When formaldehyde reacts with ammonia, it gives
a. aldehyde ammonia b. formic acid
c. urotropine d. methyl amine
97. Dettol is an example of
a. analgesic drug b. antipyretic drug
c. antibiotic drug d. antiseptic drug
98. BHC is an example of
a. Condensation polymer b. addition polymer
c. azo dye d. pesticide

99. Protein is a compound having
    a. either linkage b. ester linkage
    c. peptide linkage d. amine linkage
100. Which one of the following is present as a sugar unit in DNA?
    a. glucose b. sucrose
    c. deoxyribose d. ribose

Tribhuvan University
Institute of Science and Technology
4 Years Bachelor in Computer Science and Information Technology (BSc. CSIT)

Entrance Examination 2073

Full Marks: 100
Time: 2 hrs.

Attempt all questions:

Mathematics (25 × 1 = 25)

1. Which one is not a logical statement:
   a. If you work hard, you will pass
   b. I am sick.
   c. The sun rises in the west.
   d. 30 is a number.
2. If $|x-2| = 5$, then x is in
   a. {3,5} b. {2,∞} c. {2,5} d. {-3,7}
3. $A - B\ =$
   a. B-A b. $\bar{A} - \bar{B}$ c. $\bar{B} - \bar{A}$ d. $\bar{B} - A$
4. If $f(x) = 2x - 3$, then $f^{-1}(x) =$
   a. $\frac{x+3}{2}$ b. $\frac{1}{2x-3}$ c. $\frac{1}{3-2x}$ d. $\frac{1}{2x+3}$
5. The period of the function f(x) = sin (2x+5) is
   a. 2π b. π⁄2 c. π d. −π
6. The fourth, seventh and tenth terms of a G.P. are l,m,n respectively, then
   a. $ln = m^2$ b. $l^2 = m^2 + n^2$
   c. $l^2 =\ mn$ d. $n^2 = lm$
7. The nth term of the series: 1.3+3.5+5.7+..... is
   a. (n+1)(n+2 b. (n+1)(n+3)
   c. $4n^2 - 1$ d. n(n-1)
8. The value of $\sin(\cos^{-1} x)$ is
   a. x b. $1 - x^2$ c. $1 + x^2$ d. $\sqrt{1 - x^2}$
9. If cosec^{2}x-2=0, then x is
   a. ± π⁄6 b. ± π⁄4 c. nπ±π⁄4 d. nπ+π⁄2
10. If ,A= $\begin{pmatrix} k & 1 & 0 \\ 2 & 0 & k \\ 0 & 2 & -1 \end{pmatrix}$ $and\ if\ |A| = 0$ then k =
    a. 1 b. -1 c. 0 d. ± 1
11. The value of x for which A = $\begin{bmatrix} 6 & x-2 \\ 3 & x \end{bmatrix}$ has no inverse is
    a. 0 b. 1 c. -2 d. 2
12. If the system of equation has zero solutions only then the solution is
    a. non trivial b. trivial
    c. unique d. particular
13. $(1 + i)^6 + (1 - i)^6 =$
    a. 0 b. i c. 16 d.-16
14. $\left(\frac{2i}{1+i}\right)^2 =$
    a. –I b. 1+i c. 2i d.-2i
15. If one root of $5x^2 + 2x - k = 0$ is the reciprocal of the other than k =
    a.-5 b. 5 c. 2/5 d.5/2
16. The equation $x^2 - 2xy + y^2 + 3x - 2 = 0$ represents:
    a. hyperbola b. parabola c. ellipse d. circle
17. The area of the triangle with vertices (1,-1), (-1,1) and (-1,-1) is
    a. ½ b. -2 c. 2 d. 0

18. $\lim_{n\to\infty} \frac{1+2+\cdots\ldots\ldots+n}{n^2} =$
    a. ½ b. 0 c. 1/n d. n
19. $\lim_{x\to0} \frac{5x^2+4xtanx}{x^2} =$
    a. 9 b. 0 c. 5 d. 4
20. If $y = \sqrt{\left(x+\sqrt{\left(x+\sqrt{(x+\cdots\ldots\ldots}\right)}\right)}$ then $\frac{dy}{dx}$ =
    a. $2\sqrt{x}$ b. $\sqrt{3}x$ c. $\frac{\sqrt{x}}{2y-1}$ d. $\frac{1}{2y-1}$
21. If $y = e^{\sqrt{(ax^2+b)}}$ then dy/dx=
    a. $\frac{axy}{\sqrt{ax^2+b}}$ b. $\frac{axy}{\sqrt{(ax^2+b)}}.e^{\sqrt{(ax^2+b)}}$
    c. $\frac{x}{\sqrt{(ax^2+b)}}$ d. $e^{\sqrt{(ax^2+b)}}$
22. $\int \frac{dx}{1-x^2}$=
    a. $\cos^{-1}x + c$ b. $\frac{1}{2}\ln\left|\frac{1-x}{1+x}\right| + c$
    c. $\sin^{-1}x + c$ d. $\frac{1}{2}\ln\left|\frac{1+x}{1-x}\right| + c$
23. $\int_1^2 \frac{\sin(\ln t)}{t}\, dt =$
    a. $1 - cos(ln2)$ b. $cos2$
    c. $cos(ln2)$ d. $1 + cos(ln2)$
24. The critical points for $f(x) = x^3 - 3x$ are:
    a. ± 3 b. ± √3 c. ± 1 d. 0, ± √3
25. The area bounded by the a-axis and the curve $y = x^3$ and ordinates of x =2 and x =4 is
    a. 60sq. units b. 256 sq. units
    c. 240 sq. units d. 272 sq. units

English (25 × 1 = 25)

26. Government has a lot to .... road accidents.
    a. answer back b. answer for
    c. answer to d. answer into
27. He inherited a fortune and .... it in a year.
    a. ran into b. ran over
    c. ran through d. ran onto
28. His father blamed him but his mother .... and said he had acted sensibly.
    a. stand for b. stand up to
    c. stand out d. stand up for
29. Do you .... me .... a fool?
    a. take, for b. take, in
    c. take, to d. take, after
30. The captain .... , not realizing that the icebergs were so close.
    a. turn in b. turn on
    c. turn away d. turn down
31. After a month's treatment at a hospital my brother is ....
    a. As good as good b. as heavy as lead
    c. As gay as a lard d. as fit as a fiddle

Direction: Select the word/phrase which is closest to the opposite or similar in meaning of the word.

32. Squeamish (similar meaning)
    a. very dirty b. gullible
    c. easily upset d. braggart
33. Bramble (similar meaning)
    a. wild cat b. wild bush with thorn
    c. tall plant d. wild animal
34. Congruous (similar meaning)
    a. consistent b. covert
    c. Irregular d. clamorous
35. savior (opposite meaning)
    a. Protector b. destroyer
    c. Nurturer d. designer
36. Scabrous (opposite meaning)
    a. scaly b. scabby c. decent d. zigzag
37. un-availing (opposite meaning)
    a. Unavailable b. re past
    c. Successful d. rare

Direction: Select the proper prepositions and conjunctions to fill in the blanks in the following questions:

38. He died .... cancer but she died .... a train accident
    a. out, at b. off, by c. for, in d. of, in
39. Divide forty .... Eight but divide these apples .... the two children
    a. for, among b. at, between
    c. in, among d. by, between
40. It is a lovely place to live ....
    a. in b. for c. for, in d. of, in
41. He is angry .... and indifferent ....me.
    a. from, from b. by, by
    c. with, to d. during
42. You alone can relieve me .... this anxiety.
    a. from b. of c. in d. during
43. He took the food play with your watch .... he breaks it.
    a. should b. in case c. lest d. might

Direction: Each of the following idioms an phrases is followed by four explanations. Mark the one that best explains its meaning.

44. On the bottle
    a. teetotaler b. vegetarian
    c. drinking a lot d. avoid alcohol

Direction: Mark one that best explains its meaning

45. On the rocks
    a. in great success b. in serious trouble
    c. heavy star d. in progress
46. Call it a night
    a. stop some activity b. feel lazy
    c. enjoy the night d. belated activity
47. Bide one's time
    a. to be punctual b. swearing frequently
    c. use rough language d. act like a soldier
48. Over the hill
    a. high land b. mountain area
    c. most difficult part d. rough road
49. How many syllables does the word "pleasurable" have?
    a. Three b. two c. one d. four
50. The fear of blood is called
    a. chirophobia b. ergophobia
    c. monomania d. hematophobia

Physics (25 × 1 = 25)

Symbols carry their usual meaning:

51. In the gas equation $(p + \frac{a}{V^2})$(v-b).= RT , the dimensions of 'a' are
    a. ML^2T^{-2} b. ML^5T^{-2} c. L^6 d. L^{-6}
52. The number of significant figures in 1400 are
    a. 0 b. 1 **c. 2** d. 4
53. A man walks 8m forwards East and 6m towards North. The magnitude of displacement is
    a. 14m b. 2m
    c. 8m d. $\sqrt{(8^2 + 6^2)}$m
54. If initial velocity of a projectile is doubled, the maximum range will by
    a. 2 times b. 4 times c. 8 times d. 16 times
55. Which of the following friction is maximum?
    a. rolling b. kinetic
    c. rolling +kinetic d. static
56. If the speed of rotation of earth increases, the weight of the body on earth's surface becomes.
    a. smaller b. zero
    c. greater d. unaffected
57. A weightless rubber balloon has 100 g of water in it. Its weight in water will be
    a. 100g b. 50g c. > 100g d. zero
58. The temperature of a substance increase by 270°C. This increase is equal to
    a. 300K b. 0K c. 270K d. 273K
59. Which of the following gases possess maximum rms speed at a given temperature?
    a. H_2 b. N_2 c. O_2 d. He
60. The black body emits
    a. line spectrum b. band spectrum
    c. continuous spectrum d. mixed spectrum
61. The field of view is maximum for
    a. plane mirror b. concave mirror
    c. convex mirror d. cylindrical mirror
62. Sky seen from earth appears blue because of
    a. scattering of lights b. dispersion of lights
    c. reflection d. polarization
63. A person cannot see objects clearly beyond 50 cm. The power of the lens to correct the vision is
    a. +5 D b. -5 D c. -0.5 D d. -2 D
64. An isolated conducting sphere is given a positive charge. Its mass
    a. Increases b. decreases
    c. remains constant
    d. may increase or decrease depending on material
65. Three capacitors each of capacitance 3μ F are connected in series. The net capacitance is
    a. 1 μ F b. (1/3) μ F c. 3 μ F d. 9 μ F
66. Kirchoff's voltage law is based on the principle of conservation of
    a. charge b. energy
    c. momentum d. mass of charges
67. A charged particle enters in a strong magnetic field. Then its kinetic energy
    a. increases b. decreases
    c. remains constant
    d. increases and becomes constant
68. The self-inductance of a straight wire is
    a. zero b. ∞ c. negative d. positive
69. The photoelectric is based on the law of conservation of
    a. energy b. mass c. momentum
    d. angular momentum of photons
70. When a radioactive element emits a β-particle the mass number of the atom
    a. increase by one b. decreases by one
    c. remains the same d. decreases by four
    Ans: In this type of decay only neutron changes into proton and electron so total number of neutrons + protons do not change.
71. On increasing the reserve bias to a large value in a p-n junction diode, the current
    a. increases slowly b. remains fixed
    c. decreases slowly d. suddenly increases
72. The equation of sound wave is $y = 0.0015\, sin(62.4x + 316t)$ The wave length of sound wave is
    a. 0.2 unit b. 0.1 unit c. 3.3 unit
    d. not known from the given equation
73. A wave is reflected from a rigid support. The change of phase on reflection will be
    a. 0 b. π/2 c. π/4 d. π
74. A car at rest is playing 'HORN'. If it start moving towards you, the pitch heard would be
    a. higher b. less c. same d. nil
75. In which region of electromagnetic spectrum does the Lyman series of H atom lie?
    a. Ultraviolet b. visible
    c. infrared d. microwave

Chemistry (25 × 1 = 25)

76. The oxidation of Fe in $K_3[Fe(CN)_6]$ is
    a. +2 b. +3 c. +4 d. +5
77. How many oxygen atoms are present in 8.0 g of oxygen?
    a. 6.023×10^{23} b. 3.0115×10^{23}
    c. 7.83×10^{23} d. 5.83×10^{23}
78. "Atomic orbitals are filled up in the ground state in order of increasing energy level". This statement is called
    a. Pauli's Exclusion Principle
    b.Hund's rule c. Aufbau principle
    d. Heisenberg's Uncertainty Principle
79. The spectral region for the Lyman series of hydrogen spectrum lies in the
    a. infrared region b. visible region
    c. ultra-violet region d. microwave region
80. The crystal structure of sodium chloride is
    a. body centered cubic b. simple cubic
    c. hexagonal d. face centered cubic
81. Which of the following halogens has highest electrons affinity?
    a. fluorine b. iodine
    c. bromine d. chlorine
82. Ammonia is manufactured by
    a. Haber's process b. Contact process
    c. Down's process d. Ostwald's process
83. An example of acidic oxide is
    a. SO_2 b. N_2O c. CO d. ZnO

84. The shape of BeF2 molecule on the bases of VSEPR theory is :
a. trigonal planar b. linear
c. tetrahedral d. trigonal pyramidal
85. Which of the following compound is not a primary standard substance?
a. oxalic acid b. potassium dichromate
c. potassium bromated
d. potassium permanganate
86. An example of Lewis base is
a. BF_3 b. $SnCl_4$ c. $FeCl_3$ d. NH_3
87. The unit of equivalent conductivity is
a. $Scm^2\ equivalent^{-1}$ b. $Ohm.cm$
c. $S\ cm^{-1}$ d. $S\ cm^2\ mole^{-1}$
88. 1 calorie is equals to
a. 4.184 Joules b. 5.174 Joules
c. 6.184 Joules d. 3.184 Joules
89. Gibb's Helmholtz equation is
a. ΔE = Q +W b. Δ G = ΔH-TΔ S
c. G= H + TS d. ΔE=Q-W
90. The unit of rate constant for third order reaction is
a. S^{-1} b. $mol^{-2}L^2s^{-1}$
c. $mol^{-1}LS^{-1}$ d. $mol\ L^{-1}s^{-1}$
91. The reaction of benzene with alkyl chloride in presence of anhydrous AlCl3 is
a. Friedel Craft's reaction b. Wurtz's reaction
c. Reimer Tiemann's reaction
d. Grignard reaction
92. Primary, secondary and tertiary alcohols are distinguished by
a. Victor Meyer's test b. Tollen's reagent
c. Hoffman's test d. Beilstein's test
93. Williamson's synthesis is used for the preparation of
a. alcohol b. aldehyde
c. ketone d. ether
94. The catalyst used in Rosenmund's reduction is
a. $Pd-CuSO_4$ b. $Pd-CaSO_4$
c. $Pd-CuCl_2$ d. $Pd-BaSO_4$
95. The reaction of Phenol with concentrated nitric acid and concentrated sulphuric acid gives:
a. picric acid b. 2 – nitro phenol
c. 4-nitrophenol d. aniline
96. When benzamide is treated with aqueous Br_2 in presence of aqueous alkali, the product formed is:
a. aniline b. benzene
c. toluene d. nitroso amine
97. Amino acid contains
a. – OH group b. – CHO group
c. – NH_2 and –COOH groups d. –CO group
98. Martius yellow is an example of
a. direct dyes b. acid dyes
c. basic dyes d. mordant dyes
99. The molecular formula of green vitriol is
a. $FeCl_3$ b. $FeSO_4.7H_2O$
c. $ZnSO_4.7H_2O$ d. $CuSO_4.5H_20$
100. Which is the most important ore of Zinc
a. Zincite b. Zinc blende
c. Framklinite d. Wilemite

Tribhuvan University
Institute of Science and Technology
4 Years Bachelor in Computer Science and Information Technology (BSc. CSIT)
Entrance Examination 2074

Full Marks: 100
Time: 2 hrs.

Attempt all questions:

Mathematics (25 × 1 = 25)

1. p/q q∈ R, is undefined if
a. p $\neq o, q=0$ b. p=0 , q= 0
c. p $\neq o, q\neq 0$ d. p= 0, $q\neq 0$
2. $[a,b]=$
a. {x: a≤ $x\leq b$} b. {x: a<x<b}
c. {x: a<x≤ b} d. {x: a≤ $x<b$}
3. If f: R → R defined by f(x)= $\sqrt{(4-x^2)}$ then f(-3) is
a. Undefined b. $\sqrt{13}$ c. $i\sqrt{5}$ d. – $\sqrt{13}$
4. If |x|=1 then x is
a. {1} b. {-1} c. {-1, 1} d. {-1,-1}
5. If $\log_2(x-7)=1$, then x is
a. Not know b. 8 c. 6 d. 9
6. The value of $\sin\left(\cos^{-1}\frac{4}{5}\right)$ is
a. 4/5 b. 3/5 c. 5/4 d. 5/3
7. If $\tan^2 x=3$ then x is
a. n$\pi+\frac{\pi}{3}$ b. n$\pi-\frac{\pi}{3}$ c. n$\pi\pm\frac{\pi}{3}$ d. nπ
8. If $k+2$,$4k-6$,$3k-2$ are in AP then k is
a. -6 b. 0 c. 3 d. -3
9. The sum of infinity of 1-1/2 +1/4 -1/8 ...... is
a. 0 b. 2/3 c. 1/3 d. 1
10. If $A=\begin{pmatrix}1\\2\\3\end{pmatrix}$ and B = (1 2 3) then AB is
a. (1 4) b. (1 4 9) c. 0 d. $\begin{pmatrix}1&2&3\\2&4&6\\3&6&9\end{pmatrix}$
11. The value of $\begin{vmatrix}0&2&3\\1&2&3\\4&8&12\end{vmatrix}$ is
a. 10 b. 1. c. 0 d. -1
12. The matrix $\begin{pmatrix}1&2&3\\2&0&4\\3&4&5\end{pmatrix}$ is
a. Diagonal b. symmetric
c. Skew symmetric d. unit
13. $[2(cos\ 15+i\ sin\ 15)]^6=$
a. 64i b. 64 c. 0 d. -64i
14. $(1+\omega+\omega^2)^3+(1+\omega-\omega^2)^3=$
a. 16 b. 16 ω c. -8 d. 16 ω^2
15. The quadratic equation whose roots are -3 and 2 is
a. $x^2+x-6=0$ b. $x^2+x+6=0$
c. $x^2-x-6=0$ d. $x^2-x+6=0$
16. The line kx+3y+5=0 and 5x-2y-6=0 are perpendicular to each other for k=
a. 6/5 b. -6/5 c. 3/5 d. -3/5
17. The lines represented by $5x^2+3xy+ky^2=0$ are perpendicular to each other for k=
a. 5 b. 3 c. 0 d.-5
18. The equation of tangent to the circle $x^2+y^2=2$ at (1, 1) is
a. $x+y=2$ b. $x-y=2$
c. $2x+2y=3$ d. $-x-y=2$

19. $\lim_{x\to\infty} \frac{3x^2+2x-5}{6x^2+4x-7} =$
a. 2 b.3 c. 5/7 d. ½
20. $\lim_{x\to 0} \frac{1-\cos ax}{x^2} =$
a. $\frac{a^2}{2}$ b. a^2 c. $2a^2$ d. $4a^2$
21. If x= t+ sint, y=1- cost then dy/dx is
a. tant b. tan t/2 c. –tan t d. –tan t/2
22. The derivative of cos x w.r.t. sin x is
a. –tanx b. tanx c. cotx d. –cotx
23. The point of inflection of $y = x^3 - 12x^2$is
a. 12 b.-12 c. 4 d. 0
24. $\int \frac{dx}{\sin^2 x} =$
a. $cotx$+ C b. –cot x+ C c. tanx+C d. - tanx+C
25. $\int_0^1 \frac{dx}{1+x^2} =$
a. $\frac{\pi}{4}$ b. $\frac{\pi}{2}$ c. 0 d. 1

English (25 × 1 = 25)

26. The word “commemorate” has the stress on ....syllable.
a. first b. second c. fourth d. third
27. The word “go” has the same vowel sound as the word ....
a. nor b. four c. sew d. tour
28. I hope that a school ....for college children.
a. opens b. is opened
c. has to be opened d. be opened
29. One who is found of fighting is
a. Bellicose b. bigot c. pacifist d. fatalist
30. Select the right Antonym to the word “ambiguous”.
a. Obvious b. clear c. clear d. expressed
31. Give the opposite meaning of “ominous”.
a. rash b. auspicious c. folly d. fictitious
32. He die ....cancer but she died .... the loss of blood.
a. Of, from b. From, of c. of, at d. on at
33. Whom did you give it ....?
a. At b. for c. from d. to
34. The dog sprang ....a cat.
a. Upon b. on c. at d. from
35. Insert the missing vowels in these word d-cease ,suit-vs
a. e-i-o b. i-o-e c. o-i-e d. e-e-e
36. Choose the correct word from given option: Rice and curry ....my favorite dish.
a. are b. has c. is d. am
37. There is snag in it somewhere.
a. drawback b. Insect c. profit d. Garland
38. Custom of having many wives is called
a. Bigamy b. polygamy
c. monogamy d. matrimony
39. Choose the right word Monkeys........
a. Growl b. gibber c. yelp d. howl
40. Choose the right grammatical category of the underlined phase. Ram handed a book (<u>to his sister</u>.)
a. Complement b. direct object
c. adjunct d. Indirect object
41. The car needs ....hood repaired.
a. Its b. it’s c. itself d. there
42. These two photographers are .... same.
a. A b. an c. the d. same
43. The girl is versatile ,means
a. Bad b. gifted c. clumsy d. unlucky
44. The word “aggression ” takes the prefix
a. Non b. un c. in d. il
45. Fear of fire is called ....
a. sitophobia b. pyrophobia
c. trichophobia d. monomania
46. Which of the following is a noun?
a. Real b. readable c. readable d. reality
47. We waited of the bus stop........the bus came
a. Fill b. until c. while d. unless
48. One who travels from place to place.
a. Itinerant b. mendicant c. tramp d. tourist
49. You.re coming to the party ....?
a. aren’t you b. cant ‘you
c. won’t d. Isn’t you
50. Are you my friend or enemy? Has a ________tone.
a. rising and rising b. rising and falling
c. rising d. falling and falling

Physics (25 × 1 = 25)

51. The order of magnitude of radius an atom is
a. 10^{-7} m b. 10^{-10} m c. 10^{-12} m d. 10^{-15} m
52. a projectile goes farthest away from the earth, When the angle of projection is
a. 0^0 b. 45^o c. 90^o d. 120^o
53. A simple pendulum when set into vibration comes to rest after sometime become of
a. friction of air b. tension of air
c. gravity d. its mass
54. Power clings to the skin because of
a. compression b. cohesion
c. adhesion d. capillarity
55. Viscosity is the inherent property of liquids and gases and is more closely related to
a. inertia b. Shearing strain
c. transfer of momentum d. surface tension
56. A bridge of steel has length 700m, the temperature varies from 243K to 131K. The change in length of the bridge for above seasonal variation in temperature is (α steel=$11X10^{-6}$/K)
a. 15.4cm b. 15.4cm
c. 15.8cm d. 86.24 cm
57. The internal energy of a perfect gas does not change during
a. adiabatic process b. isothermal process
c. isobaric process d. isochoric process
58. The efficiency of steam engine is of the order of
a. 10% b.20% c. 60% d. 100%
59. A gas does maximum work when it expands
a. isothermally b. isobarically
c. adiabatically d. isochorically
60. When two wave overlap the result is large disturbance means
a. The interface is constructive.
b. The interface is destructive.
c. The interference depends on the type of wave.
d. All of the above
61. While standing still, an observer measure the frequency of a tuning fork to be 524 Hz. What frequency does he

measure as he approaches the fork at 5m/s? (Speed of sound in air = 340m/s)
a. 500Hz b. 420Hz c. 520Hz d. 532Hz

62. In longitudinal wave the displacement of the particles of the medium is
a. parallel to the wave velocity
b. anti- parallel to the wave velocity
c. perpendicular to the wave velocity
d. parallel or anti parallel to wave velocity

63. The illuminance at a distance of 2m from a 100 candela lamp is
a. 10 lux b. 15 lux c. 25lux d.100 lux

64. When light beam is incident on a prism , is causes
a. Lateral shift b. dispersion only
c. deviation only
d. dispersion and deviation both

65. If critical angle for a material placed in air is 30^o , the refraction index will be
a. 2 b. 0.5 c. 1.5 d. 2.5

66. A body has 1C of negative charge. How many excess electrons it has as compared to its neutral state?
a. $6.25 X 10^{18}$ b. $6.25 X 10^{-19}$
c. $1.6 X 10^{-19}$ d. $1.6X 10^{18}$

67. On heating a liquid , the refraction index generally
a. does not change b. decrease c. increase
d. may increase or decrease depending on the rate of health

68. The torque on electric dipole of moment vector (p) when placed in an electric filed vector (E) is proportional to
a. P/E b. E/P c. P.E d. $PE\ tan\theta$

69. Wheatstone bridge is used to measure
a. emf b. potential c. current d. resistance

70. Magnetism of magnet
a. is Zero at absolution zero temperature
b. increase with temperature
c. is maximum at curie temperature
d. becomes practically zero curie temperature

71. The self-inductance of coil is 10mH. If a current of 2A is flown. What is the magnetic flux through the coil?
a. 0.02 Wb b. 0.01Wb c. 0.05Wb d.10Wb

72. The positive rays are
a. electromagnetic waves b. positrons
c. ions d. protons

73. Wavelength of a photon is 4000 $\dot{A}$. Its energy will be
a. 3KeV b. 4000 eV c. 3.1 J d. 3.09 eV

74. According to Bohr's model of the H atom ,the radius of the stationary orbit characterized by the principle quantum number n is proportional to
a. 1/n b. n^2 c. n d. $\frac{1}{n^2}$

75. In some substance, charge can flow at ordinary temperature but not at very low temperature These are
a. semiconductors b. conductors
c. insulators d .dielectrics

Chemistry (25 × 1 = 25)

76. The number of atoms of carbon present in 25.0g of $CaCo_3$ is
a. $1.505 X 10^{23}$ b. $1.005 X 10^{23}$
c. $1.205 X 10^{23}$ d. $1.303 X 10^{23}$

77. The electronic configuration of chromium is
a. $[Ar]3d^5 4s^1$ b. $[Ar]3d^6 4s^2$
c. $[Ar]3d^7 4s^2$ d. $[Ar]3d^4 4s^2$

78. The structure of CO_2 molecule is
a. linear b. tetrahedral
c. angular d. pyramidal

79. Which of the following elements has highest electron affinity?
a. chlorine b. bromine
c. iodine d. fluorine

80. The oxidation number of Fe in the compound Fe_3O_4 is
a. 1.3333333 b. +4/3
c. +2/3 d. +8/3

81. MgO is an example of
a. basic oxide b. amphoteric oxide
c. neutral oxide d. acidic oxide

82. Down' process is used for the extraction of
a. sodium b. sodium hydroxide
c. sodium carbonate d. ammonia

83. The IUPAC name of $C-(CH_3)_4$ is
a. 2.2 dimethyl propane
b. 2-methyl butane
c. 2-methyl propane
d. Pentane

84. Al_4C_3 reacts with water to give
a. CH_4 b. C_2H_2 c. H_2 d. C_2H_4

85. Protein is a polymer of
a. glycol b. glucose
c.α –amino acid d. pthalic acid

86. Which of the following carbohydrate gives Tollen's test?
a. glucose b. fructose c. galactose d. maltose

87. DDT is an example of
a. insecticide b. herbicide
c. fungicide d. rodenticide

88. Tranquilizers are substance used for the treatment of
a. cancer b. mental anxiety
c. physical disorder d. malaria

89. Each carbon atom in benzene is
a. sp^2 hybridized b. sp hybridized
c. sp^3 hybridized d. sp^3 d hybridized

90. Primary , secondary and tertiary alcohols are distinguished by
a. Hoffman's test b. Fehling's solution
c. Victor Meyer's test d. Brillstein's test

91. The reduction of aldehydes or ketones by amalgamated zinc and concentrated HCl to corresponding alkane is called as
a. Clemenssion reduction
b. Wolf-Kishner reduction
c. Cannizaro's reduction
d. Perkin's reaction

92. Which of the following compound is most basic?
a. NH_3 b. CH_3NH_2
c. $(CH_3)_2NH$ d. $(CH_3)_3N$

93. The molecular formula of the white vitriol is

a. $ZnSO_4.7H_2O$ b. $Zn(OH)_2$
c. $ZnCO_3$ d. ZnO

94. Cinnabar is an ore of
a. zinc b. copper
c. mercury d. iron

95. The pH of 0.04M HNO3 is
a. 1.4 b. 2 c. 3 d. 4

96. The unit of cell constant is
a. Sm^{-1} b. ohm
c. cm^{-1} d. $ohm^{-1}\ cm^{-1}$

97. The unit of rate constant for first order reaction is
a. $mol\ \ s^{-1}$ b. $L\ \ mol^{-2}\ s^{-1}$
c. s^{-1} d. $mol\ L^{-1}\ s^{-1}$

98. Which of the following is an intensive property?
a. Volume b. mass
c. area d. concentration

99. The unit of radioactivity is
a. curie b. nik/L
c. gauss d. g/L

100. The compound $Na_2[Fe(CN)_5NO]$ is known as
a. sodium nitroprusside b. Prussian blue
c. Tollen's reagent d. Bayer's reagent

Tribhuvan University
Institute of Science and Technology

4 Years Bachelor in Computer Science and Information Technology (BSc. CSIT)
Entrance Examination 2075

Full Marks: 100
Time: 2 hrs.

Attempt all questions:

Mathematics (25 × 1 = 25)

1. a/b, a, b ∈ R, is equal to zero if
a. a ≠0, b = 0 b. a=0, b=0
c. a = 0, b≠0 d. a≠0, b≠0

2. If x≥5 then x may be
a. -5 b. 6 c. 0 d. [5, ∞)

3. If |x-2| = 5 then the value of x is
a. {5} b. {-2, 5} c. {-2, -5} d. {-3, 7}

4. The range of the relation R = {(1, 2), (2, 3), (3, 4)} is
a. {1, 2, 3} b. {1, 2, 3, 4} c. {2, 3, 4} d. R

5. If y = a^x is the exponential function passing through (4, 81) then the base a is
a. 4 b. 3 c. 81 d. a
Ans: 81=a^4 $or\ 3^4 = a^4\ or\ a = 3$

6. If $tan^2x\ =\ 1\ then$ x is
a. nπ±π/4 b. nπ+π/4
c. nπ-π/4 d. ±π/4
Ans: $\tan^2 x = \tan^2\frac{\pi}{4}\ or\ x =$ nπ±π/4

7. $Sin\ (2\ sin^{-1}x) =$
a. $\sqrt{1-x^2}$ b. $2\sqrt{1-x^2}$
c. $2x\sqrt{1-x^2}$ d. $\sqrt{2x(1-x^2)}$

8. The sum to infinity of the G.P.: $^1/_4$, $^1/_{16}$, $^1/_{64}$ ..... is
a. 5 b. -5 c. $^{-1}/_5$ d. $^1/_3$

9. The value of a so that 8a + 4, 6a – 2 and 3a + 7 will form an A .P. is
a. 15 b. 2 c. 9 d. 10

10. The value of $\begin{vmatrix} 2 & 3 & 4 \\ 5 & 6 & 7 \\ 10 & 12 & 14 \end{vmatrix}$ is
a. 10 b. 15 c. 0 d. 20

11. If A =(1 2 3) and B = $\begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$ then AB is
a. (4) b.(14) c. (0) d.(15)

12. The inverse of the matrix $\begin{bmatrix} -1 & 1 \\ 1 & -3 \end{bmatrix}$ is
a. $\begin{bmatrix} -3 & 1 \\ 1 & -1 \end{bmatrix}$ b. $\frac{1}{2}\begin{bmatrix} -3 & -1 \\ -1 & -1 \end{bmatrix}$
c. $\begin{bmatrix} -3 & -1 \\ -1 & -1 \end{bmatrix}$ d. $\frac{1}{2}\begin{bmatrix} -1 & 1 \\ 1 & -3 \end{bmatrix}$

13. If ω is the cube root of unity then $(1 - \omega + \omega^2)^3$=
a. 0 b. -8 c. 1 d. 8

14. $\left|\frac{1}{1+i}\right|$ =
a. $\frac{1}{2}$ b. $\sqrt{2}$ c. $\frac{1}{\sqrt{2}}$ d. 2

15. The quadratic equation whose roots are 3 and 4 is
a. $x^2 - 7x - 12 = 0$ b. $x^2 - 7x + 12 = 0$
c. $x^2 + 7x + 12 = 0$ d. $x^2 + 7x - 12 = 0$
Ans: $x^2 - (3+4)x + 3.4 = 0\ or\ x^2 - 7x + 12 = 0$

16. The perpendicular distance from (-1, -2) to the line 3x + 4y + 12 = 0 is
a. -1 b. $\frac{1}{5}$ c. 2 d. 3

17. If the lines represented by $ky^2 + (2-k)^2xy - 3x^2 = 0$ are perpendicular if k =
a. -3 b. 3 c. 0 d. 1
18. The equation of the tangent to the circle $x^2 + y^2 = 5$ at (2, 1) is
a. 2x + y = 5 b. x + y = 5
c. 2x-y = 5 d. x – y = 5
19. $\lim_{x\to\infty} \frac{x(x+1)}{x^2} =$
a. 1 b. 0 c. ∞ d. 2
20. $\lim_{x\to\pi/4} \frac{sec^2x-2}{\tan x-1} =$
a. 0 b. 1 c. 2 d. -2
21. $\frac{dy}{dx}$ of $t = x^2$, $y = 1/t$ is
a. 1 b. $-2/x^3$ c. $2/x^2$ d. $2/x^3$
22. The derivative of x^2 with respect to $-x^2$ is
a. 0 b. 1 c. 2x d. -1
23. $\int_{-1}^{1} \frac{2x}{1+x^2} dx =$
a. 0 b. log 2 c. 2 d. 1
24. $\int \frac{dx}{x(1+lnx)^2} =$
a. $-\frac{-1}{1+lnx} + c$ b. $\frac{1}{1+lnx} + c$
c. $\frac{1}{lnx} + c$ d. $\frac{1}{x(l+lnx)} + c$
25. Area bounded by the x-axis and the curve $y = 4x^2$ and the ordinate x = 1 and x = 4 is
a. 64 b. 84 c. 16 d. -84

Physics (25 × 1 = 25)

26. The rate of tension and surface tension has dimension of
a. $[M^0L^0T^0]$ b. [L] c. $[L^{-1}]$ d. $[MT^{-2}]$
27. A force of 5N acts on a body of weight 10N the acceleration of body is
a. 50 m/s² b. 2 m/s²
c. 5 m/s² d. 0.5 m/s²
28. The depth from surface of earth at which value of acceleration due to gravity become half of on the earth is
a. R b. √2 R c. R/2 d. R/4
29. Spokes in a bicycle wheel is used to
a. increase mass b. give better mass
c. increase moment of inertia d. drive easily
30. If length of wire is doubled keeping the diameter constant, it's Young's modulus will
a. Increase b. decreases
c. remain same
d. depend upon nature of matter
31. A rain drop of radius 0.3mm has terminal velocity 1m/s in air. The viscosity of air is $18X10^{-5}$ poise , then viscous force is
a. $1.01 \times 10^{-7} N$ b. $1.01 \times 10^{-8} N$
c. $1.6 \times 10^{-9} N$ d. $1.6 \times 10^{-8} N$
32. The material of least linear expansively is
a. aluminum b. invar
c. steel d. nickel
33. A glass vessel contains air at 27°C the temperature to which it must be heated so that one-fourth of air is expelled from it at constant pressure is
a. 47°C b. 77°C c. 102°C d. 127 °C
34. The efficiency of heat engine will be 100 % if the temperature of sink is
a. $0K$ b. 0^0C
c. equal to source d. none of above
35. A cylinder of 0.6 m long and 6 mm radius is rated at 1.5 KW . The temperature of filament if Stefan's constant is $6 \times 10^{-8}\ W\ m^{-2}K^{-4}$
a. 920K b. 1125 K
c. 1025 K d. 1320 K
36. Light of wavelength 550 nm falls normally on a slit of width $22*10^{-7}$m, the angular position of second minima from central maxima will be
a. 14.5° b. 30°
c. 42° d. 62°
37. Two lens of power 5D and -7.5D are placed in contact. The equivalent focal length of combination will be
a. -40cm b. +40cm
c. -25cm d.+25 cm
38. The length of microscope is 14cm and magnifying power is 25 for relaxed eye the focal length of eyepiece is 5cm than distance of object from objective is
a. 2.4 cm b. 2.1 cm
c. 1.5 cm d. 1.8cm
39. A sound wave has frequency 500 HZ and velocity 360m/s .What is the distance between 2 particles having phase difference 60°
a. 0.7 cm b. 1.2 cm
c. 70 cm d. 12 cm
40. In bringing an electron towards another electron, electrostatic potential energy of the system
a. decreased b. increases
c. remains same d. zero
41. n-equal capacitors are first connected in series and then in parallel. The ratio of maximum to minimum capacitance.
a. n² b. 1/n² c. n d. 1/n
42. A wire of resistance 12 Ω is bent to form a circle. The effective resistance between the two points on any diameter of circle is
a. 12 Ω b. 9Ω c. 6Ω d. 3Ω
43. The resistance of an ideal ammeter is
a. 0 b. low c. high d. infinite
44. A 10 ev electron is circulating in a plane at right angles to a uniform field of magnetic induction 10^{-4}T ,the orbital radius of electron is
a. 18 cm b. 16 cm c. 11 cm d.9 cm
45. Whenever the magnetic flux linked with a coil changes , there is emf induced in the circuit the emf last
a. for a short time b. for a long time
c. forever
d.so long as the change in flux takes place
46. The property of retentivity of material is useful in construction of
a. permanent magnet b. electromagnet
c. transformer d. none of above
47. The color of the positive column in a gas discharge tube depends on
a. type of glass
b. glass used for the tube

c. the gas in the tube
d. pressure inside the tube

48. The kinetic energy carried by emitted electron depends on
a. Frequency b. intensity
c. work function d. momentum

49. A nucleus reactor has a power of 16KW if the energy per fission is 200 MeV then number of fission per second is
a. 5×10^{17} b. 5×10^{16} c. 5×10^{15} d.5×10^{14}

50. To obtain p-type silicon semiconductor ,pure silicon may doped with
a.aluminum b. oxygen
c. phosphorus d. copper

English (25 × 1 = 25)

51. I promise that I won't .... to anyone.
a. Let up b. Let off c. Let on d.Let down

52. Henry .... Because of the heat and stuffy atmosphere.
a. Passed on b. Let off
c. pass off d. pass over

53. I don't want you to feel .... by my presence – please go out whenever you like
a. tie down b. tie in with
c. tie up d. throw out

54. Jenny is unpredictable, she always .... when you least expect her.
a. show off b. shut up
c. settle up d. show up

55. Don't go out. Mahesh is .... this evening.
a. call for b. call by
c. call on d. call up

56. Select the right synonym to the word "magniloquent".
a. dismal b.hazy
c. precept d. inflated

57. Give the opposite meaning of "vivacious".
a. gay b. offence
c. depressed d. faint

58. Give the opposite meaning of "mendacious".
a. false b. veracious
c. obstinate d. venal

59. One who remains silent while others talk continuously is ....
a. taciturn b. tarnish
c. blemish d. hot

60. There is no cause .... anxiety but you should take care ....your health.
a. for, in b. for ,of
c. of , after d. of , in

61. I have no sympathy .... the musicians as I have no taste .... music.
a. to, for b. for ,in
c. with ,for d. for, to

62. The boy acted contrary .... my order and he had deaf ear ....my suggestions.
a. to, on b. for ,to
c. by , to d. to ,to

63. Most of street children are addicted ....drugs and are not anxious...........their future.
a. to, for b. to, to
c. for, for d. on, at

64. A poet touches .... a subject and turn it .... a poem.
a. at, to b. upon, into c. on , to d. at ,in

65. An abnormal dread of being shut up in a small room:
a. zoophobia b. hydrophobia
c. claustrophobia d. pedophobia

66. Correct meaning of " magnum opus " is:
a. precious b. a great work
c. miraculous d. significant

67. The killing of one's wife is called :
a. uxoricide b. homicide c. filicide d. sorricide

68. Bees are kept in ....whereas fishes are kept in ....
a. aviary ,zoo b. apiary , aquarium
c. cemetery , depot d. dispensary , garage

69. Swear like trooper
a. swear sometimes
b. speak very fast
c. use swear words frequently
d. use harsh words

70. As right as rain
a. one in best emotional and physical condition
d. secure and stable
c. quick and intelligent
d. reserved and shy

71. do/ serve time
a. a bad time b. be in prison / serve a prison sentence
c. present time service
d. pleasant time

72. Call it a night
a. go out for entertainment
b. sleep well
c. stop some activity, work etc. to go to bed
d. drink before night

73. Play it by ear
a. ignore unwelcome things
b. listen attentively
c. play an instrument from memory
d. Act according to the situation

74. Be in the red
a. important occasion
b. have no money in one's bank account , owe money to the bank
c. a sign of welcome
d. very angry

75. The indirect of: he said, 'Congratulation'.
a. He said that congratulations.
b. He congratulated me.
c. He congratulated that I Passed.
d. He said that I deserved congratulations.

Chemistry (25 × 1 = 25)

76. The mass of one atom of hydrogen is approximately
a. 1.0 g b. 0.5 g
c. 1.6×10^{-24} g d. 3.2×10^{-24} g

77. Which property of an element is always a whole number
a.Atomic weight b. equivalent weight
c. atomic volume d. atomic number

78. Azimuthal quantum number specifies
a. Size of the orbital
b. Shape of the orbital
c. Energy of orbitals

d. Orientation of the orbital in space

79. Which of the following statement is correct for pure water? With increase in temperature
a. pH increases but p O H decreases
b. pH decreases but p O H increases
c. both pH and p O H increases
d. both pH and p O H decreases

80. Which has the highest first ionization potential?
a. Ne b. Mg c. Cl d. Na

81. The aqueous solution of which of the following salt will be neutral?
a. $Na_2 SO4$ b. $(NH_4)_2 SO_4$
c. $FeSO_4$ d. $Zn SO_4$

82. A first order reaction is 50% completed in 50 minutes, when will 75% of the reaction be completed?
a. 75 minutes b. 100 minutes
c. 200 minutes d. 300 minutes
Ans: In 50 minutes 50% of reaction completes and in next 50 minutes another half of 50%=25% gets completed so total time=100 minutes.

83. Malachite is an ore of
a. Fe b. Zn c. Cu d. Hg

84. In the extraction of iron from hematite using blast furnace, iron oxide is reduced by
a. Silica b. Coal c. Limestone d. CO

85. Equal volume of 1.0M HCI and 1.0 M Na OH are mixed together. The concentration of the NaCl produced would be
a. 1.0 M b. 0.5 M c. 2.0 M d. 0.1 M

86. Catalyst used in the oxidation of SO_2 to SO_3 in the manufacture of sulfuric acid by contact process is
a. Fe Powder b. Ni Powder c. Zn O d. V_2O_5

87. In a reaction 2A $+B \rightarrow C + D$ the molecularity of the reaction is
a. 1.0 b. 0.0 c. 2.0 d. 3.0
The no. of molecules involved in a reaction =3

88. Heavy water is
a. Deuterium oxide (D_2O)
b. Water in which heavier salts are dissolved
c. H_3O
d. Water formed by the combination of hydrogen and heavier isotope of oxygen

89. Coating of Zn on iron for the prevention of rusting is known as
a. Surface coating b. Electroplating
c. Sherardizing d. Galvanizing

90. The pair of compounds which cannot exist together in solution is
a. Na HCO_3 and NaOH b. $Na_2 CO_3$ and $NaHCO_3$
c. $Na_2 CO_3$ and NaOH d. $NaHCO_3$ and NaCl

91. In benzene all the C-C bonds have same length because of
a. Tautomerism b. Inductive effect
c. Metamerism d. Resonance

92. The organic acid which do not contain – COOH group is
a. Ethanoic acid b. Oxalic acid
c. Lactic acid d. Picric acid

93. The action of $NaNO_2$/ HCl on primary amine gives
a. Alcohol b. alkyl nitrite
c. Secondary d. Nitro alkane

94. In which of the following reactions, both oxidized and reduced forms of the same compound are obtained.
a. Wurtz reaction b. Riemer-Tiemann reaction
c. Cannizaro reaction d. Aldol condensation

95. Nitrating of benzene by the use of nitrating mixture is an example of
a. Electrophilic addition
b. Electrophilic substitution
c. Nucleophilic addition
d. Nucleophilic substitution

96. Antiseptic action of Dettol is mainly due to
a. Ampicillin b. Acetyl salicylic acid
c. Paracetamol d. Chloroxyenol

97. D.D.T is a
a. Insecticide b. dye
c. synthetic polymer d. antiseptic drug

98. An example of Zwitter ion is
a. Glucose b. DNA
c. Soap d. Glycine hydrochloride

99. Fructose is an example of
a. Aldose b. Ketose c. Pentose d. Hexose

100. The unit of rate constant for first order reaction is
a. Sec^{-1} b. $mol\ Sec^{-1}$
c. $mol^{-1}\ Sec^{-1}$ d. $liter^2\ mol^{-2}\ S^{-1}$

Tribhuvan University
Institute of Science and Technology
4 Years Bachelor in Computer Science and Information Technology (BSc. CSIT)
Entrance Examination 2076

Full Marks: 100
Time: 2 hrs.

Attempt all questions

Mathematics ($25 \times 1 = 25$)

1. If $f(0) = 1, f(1) = 2, f(2) = 5, f(3) = 10$,then $f(-1) =$
   a. -3 b. 0 c.1 d. 2
2. If $A \subseteq B$, then
   a. $A^c \subseteq B^c$ b. $A^c = B^c$ c. $B^c \subseteq A^c$ d. $B^c \not\subset A^c$
3. If $\log_a(ab) = x$, then $\log_b(ab) =$
   a. $\frac{x}{1-x}$ b. $\frac{1}{x}$ c. $\frac{x}{x-1}$ d. $\frac{x}{1+x}$
4. If A $= \begin{bmatrix} \frac{1}{3} & 2 \\ 0 & 2x-3 \end{bmatrix}, B = \begin{bmatrix} 3 & 6 \\ 0 & -1 \end{bmatrix}$, $AB = I, then\ x =$
   a. -1 b. 1 c. 0 d. 2
5. If $A^2 - A + I = 0, then\ A^{-1} =$
   a. $A - I$ b. A c. $I + A$ d. $I - A$
6. The sum of 3 number of G.P is 38 and their product is 1728 .The middle terms is ,
   a. 12 b. 8 c. 18 d. 6
7. Fourth roots of unity are
   a. $1, \omega, \omega^2, \omega^3$ b. $1, \omega, \omega^2, \omega^4$
   c. $\pm 1, \pm i$ d. cannot be determined
   Ans: $(\pm 1)^4 = 1\ and (\pm i)^4 = 1$
8. The multiplicative inverse of $\frac{2+3i}{3-i}$ is :
   a. $\frac{1}{13} + \frac{2i}{13}$ b. $\frac{3}{13} + \frac{11i}{13}$
   c. $\frac{3}{13} + \frac{2i}{13}$ d. $\frac{3}{13} - \frac{11i}{13}$
9. If the roots of the equation $\frac{a}{x-a} + \frac{b}{x-b} = 1$are numerically equal and opposite in sign ,then
   a. $a - b = 0$ b. $a + b = 1$
   c. $a - b = 1$ d. $a + b = 0$
10. The remainder when $(kx^2 + x - 1)$ is divider by $(x + 2k)$ is :
    a. $(-2k + 1)$ b. $(k + 1)$
    c. $(4k^3 - 2k)$ d. $(4k^3 - 2k - 1)$
11. If $\cos^{-1} x = \cos^{-1}\left(\frac{3}{5}\right) - \sin^{-1}\left(\frac{4}{5}\right)$, then $x =$
    a. 0 b. $\frac{1}{2}$ c. $\frac{\sqrt{3}}{2}$ d. 1
12. All values between 0 to 2π which satisfy $2\sin^2\theta = 3cos\theta$ is :
    a. $\frac{\pi}{3}, \frac{2\pi}{3}$ b. $\frac{\pi}{4}, \frac{3\pi}{4}$ c. $\frac{\pi}{3}, \frac{5\pi}{3}$ d. $\frac{\pi}{6}, \frac{2\pi}{6}$
13. The value of k for which the line pair $x^2 + kxy + 2y^2 + 3x + 5y + 2 = 0$ represents a straight line is
    a. 3 b. -4 c. 6 d. $\frac{7}{2}$
14. The number of common tangents that can be drawn to the two circles when they touch externally is :
    a. One b. two c. three d. four
15. The point of contact of the circle $x^2 + y^2 - 10x = 0$ with the chord $y = 2x\ are$
    a. (2, 4), (0, 0) b. (0, 0), (1, 2)
    c. (3, 2), (-1, 4) d. (1, 3), (-2, 0)
16. The angle between the lines represented by $2x^2 + 7xy + 3y^2 = 0\ is$:
    a. $\frac{\pi}{4}$ b. $\frac{\pi}{6}$ c. $\frac{\pi}{2}$ d. $\frac{\pi}{3}$
17. $\lim_{x\to\infty} \frac{ax^2+bx+c}{dx^2+ex+f}$
    a. $\frac{b}{e}$ b. $\frac{a}{d}$ c. $\frac{abc}{def}$ d. $\frac{ae}{bd}$
18. $\lim_{x\to 3} \frac{x^n-3^n}{x-3} = 27$, and n is a positive integer , then n =
    a. 6 b. 2 c. 3 d. 4
19. $\frac{d}{dx}\ cosech^{-1}x =$
    a. $\frac{-1}{x\sqrt{x^2+1}}$ b. $\frac{-1}{x^2-1}$ c. $\frac{-1}{x\sqrt{1-x^2}}$ d. $\frac{1}{\sqrt{1-x^2}}$
20. If $y = \log_{\sqrt{x}} x$, then $\frac{dy}{dx} =$
    a. $\frac{1}{x}$ b. 1 c. $\frac{1}{xlog\sqrt{x}}$ d. 0
21. $\int \frac{1}{\sqrt{1-x^2}} dx =$
    a. $\cos^{-1} x + c$ b. $\sin^{-1} x + c$
    c. $\tan^{-1} x + c$ d. none
22. $\int \frac{\cos 2x}{\cos x} dx =$
    a. $2sinx + \log(\sec x + \tan x)$
    b. $2\sin x - \log(\sec x + \tan x)$
    c. $2\cos x - \log(\tan x)$
    d. $2\cos x + \log(\sec x + \tan x)$
23. $\int a^{\sin x} \cos x\ dx =$
    a. $a^{\sin x} + c$ b. $\frac{a^{\sin x}}{\log a} + c$
    c. $a^{\sin x} - \log a + c$ d. none
24. The point of inflection of $y = x^3 - 12x^2$ is
    a. 12 b. -12 c. 0 d. 4
25. Area bounded by $y = \sin x, x - axis$ and the ordinates x = 0 and $x = 2\pi\ is$:
    a. 0 b. 2 c. π d. 4

Physics ($25 \times 1 = 25$)

26. The displacement of a particle moving along x-axis is given by $x = a + bt + ct^2$. The acceleration of the particle is
    a. b b. c c. b+d d. 2c
27. Two masses 1g and 4g are moving with equal K-E. the ratio of their momentum is
    a. $1:6$ b. $1:2$ c. $1:4$ d. $1:\sqrt{2}$
28. The force of gravitational attraction on a body is
    a. Minimum at the equator
    b. Minimum at the poles
    c. Minimum midway between poles an equator
    d. Same at all points on the earth's surface
29. The surface energy of a drop of water of radius 'r' is proportional to
    a. r^3 b. r^2 c. r d. $1/r$
30. A body of volume 36cc floats with ¾ of its volume submerged in water. The density of body is
    a. 0.25 g/cc b. 0.75 g/cc
    c. 0.9 g/cc d. 0.1 g/cc
31. A perfect gas (γ=1.5) is compressed to one fourth of the original volume. If initial pressure of the gas is 1 atmosphere and the compression be adiabatic, then the final pressure will be
    a. 2 atm b. 4 atm c. 8 atm d. 16 atm
32. A black body is at a temperature 727°C . It emits energy at the rate which is proportional to

a. 727 b. $(727)^4$ c. 1000 d. $(1000)^4$

33. 8 g of water at 30°C is poured on a large block of ice at 0°C. The mass of ice that melts is
a. 30 g b. 50 g c. 150g d. 1600 g
34. Liquids boils when its vapor pressure is
a. Equal to total pressure on surface
b. Greater than total pressure on surface
c. Less than total pressure on surface
d. Equal to atmospheric pressure
35. The focal length of a convex lens is
a. Maximum for red color
b. Maximum for violet color
c. Maximum for yellow color
d. Same for all colors
36. The refracting angle of a prism of refractive index $\sqrt{2}$ is $60°$. The minimum deviation from it is
a. 30° b. 45° c. 60° d. 90°
37. In young's double slit experiment of interference, the distance between the slits is gradually increased. The width of the fringe system
a. increases b. decreases
c. remain same
d. first increases and then decreases
38. 2% of light of emitted by a source of luminous intensity 500 cd falls normally on a circular disc of radius 10 cm, calculate the average illumination of surface.
a. 1000 lun b. 2000 lun
c. 3000 lun d. 4000 lun
39. A hollow metal sphere of radius 10cm is changed such that the potential at its surface is 80V. The potential at the center of sphere is
a. 8V b. 80V c. 800V d. zero
40. Two capacitors of capacitances 2μF and 3μF are connected in parallel. The ratio of charges on them will be
a. 1:1 b. 2:3 c. 3:2 d. 4:9
41. The angle between geographical and magnetic meridian is called
a. angle of dip b. angle of declination
c. critical angle d. curie angle
42. A charged particle moves along the axis of a current carrying solenoid. It experiences
a. an accelerating force b. a refracting force
c. a radial force d. no force
43. The energy dissipation in a resistor of resistance R in time t is E, then the value of current flowing in the resistance will be
a. $\sqrt{\frac{E}{Rt}}$ b. $\left(\frac{E}{Rt}\right)^2$ c. ERt d. $(ERt)^{1/2}$
44. The equation of a wave travelling in a string is given by y=3 $\cos\pi\,(100t - x)$, where x and y are in cm and t is in second. Its wavelength is
a. 3 cm b. 100 cm c. 2 cm d. 5 cm
45. A source of frequency 150 Hz is moving in a direction of a person with a velocity of 110 m/s. The frequency heard by the person will be (Velocity of sound = 330 m/s).
a. 225 Hz b. 200 Hz c. 150 Hz d. 100 Hz
46. In stationary wave
a. strain is max. at nodes
b. strain is max. at antinodes
c. strain is min. at nodes
d. Amplitude is min. at all points

47. The de-Broglie wavelength of an electron in n^{th} Bohr orbit is related to the radius R of the orbit as,
a. $n\lambda = \pi R$ b. $n\lambda = \frac{3}{2}\pi R$
c. $n\lambda = 2\pi R$ d. $n\lambda = 4\pi R$
48. Which of the following electronic transitions of the hydrogen atom gives an absorption line of highest frequency?
a. $n = 1$ to $n = 2$ b. $n = 3$ to $n = 8$
c. $n = 2$ to $n = 1$ d. $n = 8$ to $n = 3$
49. The half-life of a radioactive isotope is 5 yrs. The fraction of atoms decayed in this substance after 15 years will be
a. 1 b. $\frac{3}{4}$ c. $\frac{1}{8}$ d. $\frac{7}{8}$
50. What are $\beta - rays$?
a. E.M $waves$
b. Electron orbiting round the nucleus
c. Charge particle emitted by nucleus
d. Neutral particle

English (25 × 1 = 25)

51. He met the wounded soldiers and helped ....
a. them b. him c. himself d. themselves
52. He cut ... with a knife.
a. Itself b. herself c. himself d. themselves
53. The leader, with his helpers, ...stolen the bags.
a. Have b. has c. having d. were
54. Her husband and she ... gone home.
a. Has b. have c. having d. is
55. One should not mock at the poor, ...?
a. Shouldn't one b. should one
c. should he d. shouldn't he
56. Those books are not yours, ...?
a. are they b. aren't they
c. are those d. aren't yours
57. He lived in this city ... ten years.
a. For b. till c. to d. during
58. Sit ... me.
a. Besides b. beside c. to d. between
59. Unless you use English, ...
a. It will not improve b. It will improve
c. It would improve d. It would not improve
60. If he had tried, ...
a. He will win the prize.
b. He would have won the prize.
c. He would win the prize.
d. He wouldn't have won the prize.
61. He plays ... football.
a. a b. an c. the d. no article
62. He went to ... theatre.
a. a b. an c. the d. no article
63. What is an antonym of 'sow'?
a. Spread b. reap c. grow d. take
64. What is an antonym of 'faulty'?
a. Flawless b. wrong c. faculty d. strong

65. What is a synonym of 'check'?
a. Test b. cheap c. attentive d. win

66. What is a synonym of 'present'?
a. Free b. gift c. suggest d. greet

67. The passive form of 'Do we eat sand?'
a. Is sand eaten? b. Was sand eaten?
c. Did we eat sand? d. Sand is eaten.
68. The passive form of 'People sell fish here.'
a. Fish was sold here b. Fish is sold here.
c. Fish is being sold here d. Fish sold here.
69. She said to me, "I will do it myself."
a. She tells me that she will do it herself.
b. She told to do it herself.
c. She told me that she would do it herself.
d. she did it herself.
70. Rekha said, "Open your mouth."
a. Rekha told me to open my mouth.
b. Rekha opened her mouth.
c. Rekha said to open her mouth.
d. Rekha told me to open her mouth.
71. He ... to Pokhara every year.
a. Goes b. is going c. has gone d. is
72. The fear of height is called ...
a. Acrophobia b. bathophobio
c. heightphobia d. none
73. He ... before the doctor arrived.
a. Has died b. had died c. die d. has die
74. The word 'fire' takes the prefix...
a. Mis b. mono c. micro d. mid
75. The present participle of 'die' is...
a. Dieing b. died c. dies d. dying

Chemistry (25 × 1 = 25)

76. The secondary suffix of the IUPAC name of the compound $CHO-CH_2-CHOH-COOH$ is
a. ol b.al c. oic acid d. oal
77. The intermediate product markovnikov's in addition is
a. Carbocation b. free radical
c. Carbanion d. All of above
78. Acetylene contains
a. 2π and 3σ bond b. 3 π and 2σ bond
c. 4σ and 2 π bond d. none
79. Lewis acid and oxidizing agents are
a. Electrophiles b. Nucleophiles
c. Both a and b d. None
80. Wurtz reaction cannot be applied to prepared
a. Methane b. Ethane
c. Butane d.Hexane
81. Which of the following will show common ion effect
a.$HCl+HNO_3$ b.$HCl+NaCl$
c.$HCl+H_2S$ d. All of above
82. Carboxylic acid has general formula as
a. C_nH_{2n+2} b.$C_nH_{2n}O$
c. $C_nH_{2n}O_2$ d. $C_nH_{2n+2}O$
83. $C_6H_{12}O_6$ is formula of
a. Glucose b. fructose
c. Galactose d. all of above
84. The mass of product is equal to mass of reactants. It is
a. Law of multiple proportion
b. Law of definite proportion
c. Law of conservation of mass
d. Law of combining volume
85. Which of the following orbital has highest energy level
a. 4d b. 3d c. 5s d. 4p
86. Oxidation state of oxygen in peroxide
a. 1 b.-1 c. -2 d. 2
87. Potential of hydrogen electrode is
a. Zero b. positive c. negative d. all
88. Which of the following has highest size?
a. Na b. Mg^+ c. Al^{++} d. All have equal size
89. The molarity of pure water is
a. 0.018M b. 18M c. 50M d. 55.55M
90. Radioactive isotopes of hydrogen is
a. Protium b. deuterium
c. Tritium d. all of above
91. The catalyst used in the contact process is
a. V_2O_5 b. $Fe(OH)_3$ c. CaO d. Fe
92. Chemical formula of white vitriol
a. ZnS b.$ZnSO_4.7H_2O$
c. FeS d. $FeSO_4.7H_2O$
93. The type of bonding in protein is
a. Hydrogen bond b. covalent bond
c. peptide bond d. all of above
94. The color of dye is due to presence of certain group containing multiple bonds called
a. Chromophore b. auxochrome
c. both d.none
95. Molecular formula of calomel is
a. $HgCl_2$ b. Hg_2Cl_2
c. $Hg+HgCl_2$ d. Hg_2Cl_2+Hg
96. $FeSO_4$ forms brown ring with
a. NO_3 b. NO_2 c. NO d. N_2O
97. Chalcopyrite is commonly known as
a. Matte b. lunar caustic
c. fool's gold d. none
98. How many structural isomers are possible for C_6H_{14}
a. 3 b. 4 c. 5 d. 7
99. Rate of first order reaction depends upon
a. Time b. temperature
c. conc. of reactant d. all of above
100. Which of the following is neutral oxide?
a. CO_2 b. H_2O c. N_2O_3 d. ZnO

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Mathematics (25 × 1 = 25)

1. The irrational number is
a. 1 b. π c. $\frac{22}{7}$ d. -1
2. If P and Q are the non-empty sets and $P \subset Q \subset U$ then $P \cap Q =$
a. P b. Q c. U d. $\emptyset$
3. A sentence which not a Statement is
a. Elephant is a small animal
b. 100 is a number
c. Hari is Nepali citizen
d. $x > 2$
4. If $|x-3| = 5$ then $x =$
a. $\{-8,2\}$ b. {8,-2}
c. $(8,-2)$ d. $\{-8,-2\}$
5. If the graph of $y = a^x$ contains the points (3,64) then the base a is
a. 4 b. 3 c. 64 d. 2
6. If $f(x) = x - 5$ for $x \in R$ then $f^{-1}(x) =$
a. $\frac{1}{x-5}$ b. $\frac{1}{x+5}$ c. $\frac{5}{y+x}$ d. $x+5$
7. The period of the function $f(x) = \cos(2x+5)$ is
a. π b. $\frac{\pi}{2}$ c. 2π d. $\frac{\pi}{3}$
8. If $\sin^{-1} x = \cos^{-1} x$ then $x =$
a. $-\sqrt{2}$ b. $-\frac{1}{\sqrt{2}}$ c. $\frac{1}{\sqrt{2}}$ d. $\sqrt{2}$
9. The solution of $\sin^2 x = \frac{1}{2}$ is
a. $n\pi \pm \frac{\pi}{6}$ b. $n\pi \pm \frac{\pi}{4}$
c. $n\pi \pm \frac{\pi}{2}$ c. $n\pi \pm \frac{\pi}{3}$
10. If $3^{rd}, 5^{th}$ and 7^{th} term of a G.P. are p, q, r respectively, then
a. $p^2 = q^2 + r^2$ b. $p^2 = qr$
c. $pr = q^2$ d. $p + q + r = 0$
11. The value of p for which $3p+4, 6p-2$ and $2p+7$ are in A.P is
a. $\frac{15}{7}$ b. 15 c. 30 d. 10
12. If $A = [a_{ij}]$, where $a_{ij} = [i+j]$, then 2×2 matrix A is
a. $\begin{bmatrix} 2 & 3 \\ 3 & 4 \end{bmatrix}$ b. $\begin{bmatrix} 2 & 3 \\ 4 & 4 \end{bmatrix}$
c. $\begin{bmatrix} 2 & 3 \\ 2 & 4 \end{bmatrix}$ d. $\begin{bmatrix} 2 & 3 \\ 3 & 2 \end{bmatrix}$
13. The value of x for the determinant $\begin{bmatrix} x+1 & 3 \\ 0 & 1 \end{bmatrix} = 0$ is
a. 0 b. 1 c. -1 d. -2
14. The system of equation $2x + 3y = 5, 2x + 3y = 7$ has
a. one solution b. two solutions
c. many solutions d. no solution
15. If ω is the cube root of unity of a complex number then $(1-\omega)(1-\omega^2) =$
a. 0 b. -2 c. 3 d. ω
16. $\sqrt{-3}\sqrt{-5} =$
a. $-\sqrt{15}$ b. $\sqrt{15}$ c. $\sqrt{-15}$ d. $-i\sqrt{15}$
17. A quadratic equation whose roots are 2. -3 is
a. $x^2 + x + 6 = 0$ b. $x^2 - x + 6 = 0$
c. $x^2 + x - 6 = 0$ d. $x^2 - x - 5 = 0$
18. The straight line represented by $3x^2 + 2xy + ky^2 = 0$ are perpendicular to each other if $k =$
a. -3 b. 3 c. 0 d. 6
19. Equation of tangent to the circle $x^2 + y^2 = 5$ at (2,1) is
a. $2x + y = 5$ b. $2x + y = 4$
c. $x + 2y = 5$ d. $2x - y = 5$
20. If $\lim_{x \to a} \frac{x^3 - a^3}{x - a} = 27$ then a =
a. 9 b. -3 c. ± 3 d. 9
21. If $y = \frac{x^2}{p^2} + \frac{p^2}{x^2}$, then $\frac{dy}{dx}$ at $x = p$ is
a. $\frac{2a}{p^2}$ b. p c. 1 d. 0
22. $\int (3\sqrt{x} + \sin x + 2e^{2x}) dx =$
a. $2x^{\frac{3}{2}} - \cos x + e^{2x}$ b. $x^{\frac{3}{2}} - \cos x + e^{2x}$
c. $2x^{\frac{3}{2}} + \cos x + e^{2x}$ d. $2x^{\frac{3}{2}} - \cos x + 2e^{2x}$
23. $\int_0^1 2xe^{x^2+3}\ dx =$
a. $e^4 + e^2$ b. $e^4 - e^2$
c. e^4 d. e^2
24. Area bounded by the x- axis and the curve $y = 3x^2$ and the lines $x =\ 2$ and $x =\ 4$ is
a. 64 b. 56 c. $\frac{56}{3}$ d. 72
25. The critical points for $x^4 - 6x^2 + 8x = f(x)$ are
a. 1, -2 b. 1, 2 c. $-1,1$ d. $-1,2$

English (25 × 1 = 25)

26. The world "permissible" is accented on its ... syllable.
a. 1^{st} b. 2^{nd}
c. 3^{rd} d. none of the above
27. Which of the following word gets stress on the first syllable?
a. perishes b. incredible
c. incur d. temerity
28. I shall be glad ... your help in my business.
a. in b. by c. of d. with
29. An addicted person is the style .... his habit.
a.to b. for c. on d. by
30. Give an appropriate synonym of the word "Vendetta".
a. pleasant b. secret
c. promise d. feud
31. Give an appropriate synonym to the word "acerbity".
a. mildness b. acrimony
c. unsuitable d. extravagant
32. Give opposite meaning word to "replete"
a. empty b. alarm c. full d. stuff
33. Give opposite meaning word to "quell"
a. encourage b. stop
c. crush d. promote
34. A disease that can be spread by touch is.....
a. pandemic b. infectious
c. endemic d. contagious
35. pick the odd word out
a. lamb b. pork
c. mutton d. venison

36. What is the right meaning of the Latin words "ad nauseam"?
a. to a disgusting degree b. regularly
c. on duty d. rarely
37. I think she will success,...............?
a. shan't she? b. won't she?
c. would she? c. doesn't she?
38. Which of the following is the adjective?
a. width b. autumnal
c. advantage d. difficult to understand
39. Don't stand on ceremony with him just because he has a title.
a. avoid someone b. maintain formality
c. pay too much attention to correct rules of behavior or be too format.
d. do every things necessary
40. This legal document is double Dutch to me.
a. emotional object b. entertainment
c. a fair chance d. difficult to understand
41. If you interfere with... nature you will suffer for it.
a. a b. an c. the d. none
42. I must.... getting a room ready for him.
a. see about b. see off
c. see to d. see through
43. The inscription was almost unreadable as must if it's letters have been...
a. wear on b. worn away
c. wear out d. wear off
44. They are helpful and .....
a. I am also b. also, I am
c. so am I d. none
45. Food that agrees to one's taste
a. edible b. pungent
c. Sensuous d. Palatable
46. Never...... to anyone.
a. did I harm b. I harmed
c. I harm d. does I harm
47. Now a day's transportation system......more expensive.
a. become b. has become
c. is becoming d. had become
48. The Mayer of our municipality makes his presentation very interesting. It is...
a. direct object b. indirect object
c. complement d. adjunct
49. One can .... these skills by one's own efforts.
a. prepare b. perform
c. collect d. frame
50. An expert in foods and nutrition is.....
a. dietician b. patrician
c. pediatrician d. nurturer

Physics ($25 \times 1 = 25$)

51. Which of the following pair have same dimension?
a. L/R and CR b. LR and CR
c. R/L and $[LC]^{\frac{1}{2}}$ d. CR and 1/LC
52. A bullet fired into a fixed target loses half of its velocity after penetrating 3 cm, the further distance travelled before coming to the rest is
a. 4 cm b. 2 cm c. 3 cm d. 1 cm
53. The horizontal range is $4\sqrt{3}$ times the maximum height in a projectile motion. The angle of projectile is
a. 15^0 b. 45^0 c. 30^0 d. 60^0
54. The 'net force acting on a body is zero' then the wrong statement is
a. body is at rest
b. acceleration is not zero
c. body is in motion
d. acceleration should be zero
55. If length of wire is doubled keeping the diameter constant, it's Young's modulus will
a. increases b. decreases
c. remain same
d. depend upon nature of matter
56. The work done to blow a soup bubble of radius 'R' is W, then work done to increases the radius form R to 3R is
a. 2W b. 8W c. 4W d. 9W
57. A metallic ball is immersed in alcohol. The coefficient of cubical expansion of metal is less than that of alcohol. When the system is heated weight of ball is
a. Increases
b. remains unchanged
c. decreases
d. first increases and then decreases
58. Latent heat of a substance is zero at
a. boiling b. critical temperature
c. melting point d. freezing point
59. The average kinetic per degree of freedom per molecules of art idea gas is
a. KT b. 2KT c. $\frac{1}{2}KT$ d. $\frac{2}{3}KT$
60. Two spheres of same material have radii in the ration 3:2. The heat radiated by them at the same temperature will be
a. 1:1 b. 4:9 c. 9:4 d. 3:2
61. Light of wavelength 550 nm falls normally on a slit of width $22 \times 10^{-5}m$, the angular position of second minima from central maxima will be
a. 14.5^0 b. 30^0 c. 42^0 d. 62^0
62. A person is in a room whose ceiling and two adjacent walls are mirrors. Number of images formed of an object is
a. 2 b. 3 c. 4 d. 5
63. The refractive index is 1.414 and refracting angle is 60^0, then minimum deviation pf light will be
a. 30^0 b. 60^0 c. 45^0 d. 72^0
64. A sound wave has frequency 500 Hz and velocity 360 m/s. What is the distance between 2 particles having phase difference60^0?
a. 0.7 cm b. 70 cm
c. 3.2 cm d. 12 cm
65. Two fixed charge q and 4q are at r distance apart. What will be positive of third charge to be placed so that the system will be in equilibrium?
a. 2r/3 from 4q b. 2r from q
c. r/2 from q d. r/2 from 4q
66. n equal capacitors are first connected in series and then in parallel. The ratio of maximum to minimum capacitance is
a. n^2 b. $\frac{1}{n^2}$ c. n d. $\frac{1}{n}$

67. A heater coil is cut into two equal parts and only one part is used in the heater. How will the heat generated vary?
a. one fourth b. doubled
c. halved d. four times
68. A 50 v battery is connected across 10 ohm resistor. The current in the circuit is 4.5 Ampere. The internal resistance of the battery should be
a. zero b. 5.0 Ohm
c. 0.5 Ohm d. 1.1 Ohm
69. A magnetic needle kept in a high-uniform magnitude field. It experiences
a. a torque but not a force
b. a force and a torque
c. neither a force nor a torque
d. a force but not a torque
70. In LCR circuit, the inductive reactance at resonance frequency is 100 Ω and resistance is 5 Ohm, the quality factor of the circuit is
a.3000 b. 500 c. 20 d. 95
71. A circuit contains a capacitor of 420 pf and an inductance L. The value of 'L' to broadcast on Radio at 1020 KHz is
a. $2.8 \times 10^{-4}\ H$ b. $7.5 \times 10^{-4}\ H$
c. $5.8 \times 10^{6}\ H$ d. $9.5 \times 10^{6}\ H$
72. Electron accelerated from rest to a potential difference of 100 volt. Its final velocity will be
a. 5×10^{5} m/s b. 3×10^{3} m/s
c. 4×10^{4} m/s d. 6×10^{6} m/s
73. When the proton collides with an electron, which of the following characteristics of proton increases?
a. Energy b. wavelength
c. Frequency d. impulse
74. The half-life of a radioactive sample is 10 years. Its means life is
a. 12.43 years b. 15.43 years
c. 14.43 years d. same as half life
75. NPN transistors are most preferred than that of PNP transistor. It is become of
a. low cost b. capable of handling low power
c. low dissipation of energy
d. high mobility of electrons that holes

Chemistry ($25 \times 1 = 25$)

76. Magnetic quantum number specifies
a. orbital size b. orbital orientation
c. orbital shape d. nuclear stability
77. The radioactive rays having highest penetrating power is
a. α $rays$ b. β $rays$ c. γ $rays$ d. X-rays
d. all have equal penetrating power
78. Which of the following has an electrovalent linkage?
a. $MgCl_2$ b. CH_4
c. $SiCl_4$ d. CCl_4
79. The element having highest value of electronegativity is
a. chlorine b. fluorine
c. bromine d. Iodine
80. Oxidation number of chromium in $Cr_2O_7^{2-}$ is
a. +6 b. +5 c. +4 d. +3
81. Which of the following is an amphoteric oxide?
a. CaO b. MgO c. CuO d. ZnO
82. The structure of Buckminster fullerene contains
a. 20 six member rings and 12 five member rings
b. 12 six member rings and 20 five member rings
c. 12 six member rings and 10 five member rings
d. 12 six member rings and 8 five member rings
83. Down's process is used for the extraction of
a. ammonia b. nitric acid
c. sodium d. sulphuric acid
84. The IUPAC name of iso-butane is
a. 2-methylpropane
b. 2,2-dimethylepropane
c. 2-methylpropene
d. 2-methylbutane
85. An alkaline $KMnO_4$ solution is known as
a. Tollen's reagent b. Baeyer's reagent
c. Fehiling's reagent d. Grignard reagent
86. When haloalkane solution is treated with metallic sodium in presence of dry ether, respective alkane is obtained. This reaction is know as
a. Wurtz reaction
b. Wolf-Kishner reduction
c. Cannizzaro's reaction
d. Reimer-Tiemann reaction
87. The general formula of alkanes is
a. C_nH_{2n} b. C_nH_{2n+2}
c. C_nH_{2n-2} d. none of the above
88. Detection of nitrogen, Sulphur and halogens in organic compounds is done by
a. Lassaigne's test b. Lacas test
c. Victor Meyer test d. Carbylamine test
89. The structure of methane is
a. trigonal planar b. linear
c. tetrahedral d. square planar
90. Equivalent weight of potassium permanganate in acidic media is equal to its
a. mol.wt./5 b. mol.wt./3
c. mol.wt./4 d. mol.wt./2
91. An example of lewis base is
a.BF_3 b. $AlCl_3$ c. $FeCl_3$ d. NH_3
92. A device which can generate electricity by means of a redox reaction is called
a. electrochemical b. galvanic cell
c. voltaic cell d. all of the above
93. 1 calorie is equal to
a. 4.184 joules b. 5.184 joules
c. 3.184 joules d. 2.184 joules
94. The rate of a reaction depends on
a. concentration of reacting species
b. temperature
c. surface area of the reactants
d. all of the above
95. Each carbon atom of benzene is
a. sp^2 hybridized b. sp^3 hybridized
c. sp hybridized d. sp^2d hybridized
96. Which is correct for the reaction of Lucas regent with tertiary alcohol?
a. no turbidity occurs at room temperature
b. turbidity appears within five minutes

c. turbidity appears immediately
d. turbidity appears within ten minutes

97. Fat is a
a. lipid b. carbohydrate
c. protein d. amino acid

98. Bakelite is made by the action of
a. phenol and formaldehyde
b. urea and formaldehyde
c. melamine and formaldehyde
d. ethylene glycol and phthalic acid

99. Which of the following compound is called corrosive sublimate?
a. Hg_2Cl_2 b. $HgCl_2$
c. $K_2[HgI_4]$ d. HgI_3

100. Hematite is an one of
a. Iron b. Copper
c. Mercury d. Silver

Tribhuvan University
Institute of Science and Technology
4 Years Bachelor in Computer Science and Information Technology (BSc. CSIT)
<u>Entrance Examination 2078</u>

Full Marks: 100
Time: 2 hrs.

Attempt all questions:

Mathematics (25 × 1 = 25)

1. Let U be the universal set , A and B be two sets .If n(U)=100, n(A). = 35, n(B) = 60 and n(AUB). = 80, then what is the value n$(A \cap B)$?
a. 20 b. 15 c. 45 d. 85

2. If A =[-3, 1] and B =[-2, 4] , then the value of A – B is
a. [-3, -2] b. [1,4]
c. [-3, -2) d. [-3,2]

3. A sentence Which is a true statement is
a. Why are you weeping?
b. $2x + 3 = 5$
c. Mount Everest is in Nepal.
d. Please help me to solve this problem.

4. Let a Function $f : N \rightarrow N$ *be defined by* $f(x) = 2x$ *for all* $x \in N$. *Then* f *is*
a. many to one b. onto
c. one to one d. one to one and onto

5. The function $f(x) = 12 - 3x$ *on* R *is*
a. increasing b. decreasing
c. constant d. increasing and decreasing

6. If $cosec\ x = -1$,then the value of x is
a. $2\,n\pi$ b. $(2n + 1)\frac{\pi}{2}$
c. $(n + 1)\pi$ d. $(2n + 1)\pi$

7. If a,b,c, be in A. P., b ,c , d, in G. P. , c , d ,e , in H. P. , then a, c, e are in
a. G. P b. H.P. c. A.P. d. None of these

8. If A = [-7] ,then the volume of Det A is
a. 7 b. ± 7 c. ∓ 7 d. -7

9. The system of equation $3x - 2y = 1$ *and* $6x - 4y = 2$ *is*
a. inconsistent and dependent
b. consistent and dependent
c. consistent and independent
d. inconsistent and independent

10. The sum of the three cube roots of one is
a. 0 b. 1 c. ω^2 d. ω

11. The value of $\lim_{x \to 0} \frac{\sin x^0}{x}$ *is*
a. 1 b. π c. $\frac{\pi}{180}$ d. $\frac{\pi x}{180}$

12. The derivative of $e^{\sqrt{x}}$ is
a. $e^{\sqrt{x}}$ b. $2\sqrt{x}\, e^{\sqrt{x}}$
c. $\frac{e^{\sqrt{x}}}{2\sqrt{x}}$ d. $e^{\sqrt{x}}$ +1

13. The value of $\int \frac{x}{1+x}\, dx$ is
a. $\ln(1 + x)$ b. $x + \ln(1 + x)$
c. $x - \ln(1 + x)$ d. $\frac{x}{1+x}$

14. The value of $\int_0^2 3(1 + x)^2 dx$ is equal to
a. 26 b. 14 c. $\frac{14}{3}$ d. $\frac{2}{3}$

15. Let A and B be two sets, then $\overline{AUB} =$
a. AUB b. $\bar{A} \cap \bar{B}$

c. $\bar{A} \cup \bar{B}$ d. $A \cap B$

16. For any real number x with $[x] < 1$, the value of $\sin^{-1} x$ is equal to
a. $\sin^{-1}\sqrt{1-x^2}$ b. $\cos^{-1}\sqrt{1-x^2}$
c. $\tan^{-1}\sqrt{1-x^2}$ d. $\cos^{-1}\sqrt{1-x}$

17. The inverse of the matrix $\begin{bmatrix} 2 & 3 \\ 3 & 5 \end{bmatrix}$ is
a. $\begin{bmatrix} 2 & -3 \\ -3 & 5 \end{bmatrix}$ b. $\begin{bmatrix} 5 & -3 \\ 3 & 2 \end{bmatrix}$
c. $\begin{bmatrix} 5 & -3 \\ 2 & -3 \end{bmatrix}$ d. $\begin{bmatrix} 5 & -3 \\ -3 & 2 \end{bmatrix}$

18. The remainder of $x^3 - 2x^2 + 5x + 10$ when divided by x+1 is
a. 14 b. 2 c. -18 d. 18

19. The acute angle between the lines $x - 3y - 6 = 0$ and $2x - y + 5 = 0$ is
a. $\frac{\pi}{2}$ b. $\frac{\pi}{3}$ c. $\frac{\pi}{4}$ d. $\frac{2\pi}{3}$

20. The coefficient of x^2 in$\left(x^2 + \frac{a^2}{x^2}\right)^3$ is
a. 3a b. $3x^2a^2$ c. 3 d. $3a^2$

21. How many numbers of three different digits less than 500 can be formed from the integers 1,2,3,4,5,?
a. 48 b. 180 c. 80 d. 20

22. The coordinate of focus of the parabola $y^2 = 8x$ is
a. (2 ,0) b. (2 ,4) c. (4 ,0) d. (0 , 2)

23. The relation between direction cosines of a line is given by
a. $a^2 + b^2 + c^2 = 1$ b. $a^2 + b^2 + c^2 = 0$
c. $l^2 + m^2 + n^2 = 1$ d. $l^2 + m^2 + n^2 = 0$

24. The unit vector in the direction of $\vec{i} + \vec{j} - 2\vec{k}$ is
a. $\frac{1}{\sqrt{6}}$ b. $\frac{1}{6}$ c. $\frac{\vec{i}+\vec{j}-2\vec{k}}{6}$ d. $\frac{l\vec{i}+\vec{j}-2\vec{k}}{\sqrt{6}}$

25. The center of the circle $x^2 + y^2 - 2ax - 2ay + a^2 = 0$ is
a. (a ,0) b. (a ,a)
c. (0 ,a) d. (-a ,-a)

English (25 × 1 = 25)

26. The word "Glissando" gets main stress on
a. 1^{st}syllable b. 2^{nd} syllable
c. 3^{rd}syllable d. none

27. Which of the following words does get its prime stress on the second syllable ?
a. Investigate b. Introverted
c. Intimate d. Intricate

28. Pick out the world or group of worlds which has nearly the same meaning as the words "Magnitude"?
a. Attraction b. Assessments
c. gravity d. weight

29. Give an appropriate synonym to the word "Outpaced"
a. occupied b. mollified
c. ruled out d. surpassed

30. Give an appropriate antonym to the word "Impulsive"
a. caution b. innocent
c. insipid d. interesting

31. Give a suitable opposite word to the word "Reputation"
a. restrains b. reluctant
c. notorious d. prudence

32. One who abandons religious faith is:
a. insolvent b. apostate
c. veteran d. fatal

33. An office which has no works and responsibility but high salary
a. sinecure b. conjurer
c. expert d. indelible

34. In the incident of fire we should warn the house owner ....danger but to a student a teacher should warn ....errors..
a. for ,to b. of , against
c. to , against d. about for

35. I am sympathetic.... Those students who are not satisfied ....their marks .
a. on ,for b. to , with
c. with ,with d. to from

36. ....I had that book with me I did not give it to him .
a. However b. Unless
c. Although d. But

37. Pick up the correct feminine gender of the world "Gander"
a. Ganderess b. Gantry
c. Grandma d. Goose

38. Give the exact meaning of the idiom "go through the roof"
a. price rise or increase quickly
b. walking on the roof from corner to corner
c. cross the roof of a house quickly
d. take no time to walk on the roof

39. Pick up the exact meaning of the word "Hellenism"
a. Belief that god is unknowable
b. conformity to or imitation of ancient Greek thought customs or styles
c. Belief that there is no God
d. strong adherence to ones community

40. Pick up correct phrasal verbs for the expression "When he was passing through the door the dogs suddenly ...him
a. set out b. set to c. set on d. set off

41. Pick up correct phrasal verbs for the expression "Would you like to help me ....the writing desk"?
a. clear up b. clear out
c. clear off d. clear on

42. Give exact meaning of the idiom "a stick in the mud"
a. a person with liberal ideas
b. a person desiring for improvement
c. a person with high ideas and values
d. a person with fixed views and ideas and not ready for any changes

43. We must be early ... we won't get seats
a. otherwise b. however
c. then d. therefore

44. Some people waste food .... Other haven't enough.
a. When b. while c. but d. if

45. If you interfere with ...nature you will suffer for it .
a. the b. a c. an d. no article

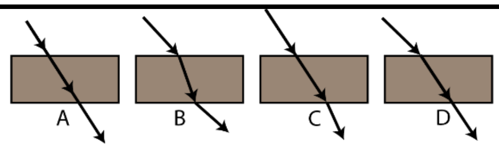
46. Some one had recognized him,.....?
a. hadn't they ? b. didn't they ?
c. did they d. had they

47. The photographs in the papers bore no ..... at all to the original.
a. nearness b. resemblance
c. comparison d. identity

48. Although they are not rich , they always wear......clothes ..
a. respectful b. respective
c. respectable d. respected
49. This is ....chosen for the school complex to be built next year.
a. site b. area
c. locality d. sight
50. Woks for which no regular salary is paid ..
a. honorable b. honorary
c. temporary d. ad hoc

Physics (25 × 1 = 25)

51. The velocity of a body is given by the equation v =b/t $+ct^2 + dt^3$.then dimensional formula of c is
a. $[M^0LT^3]$ b. $[ML^0T^3]$
c. $[M^0L^0T]$ d. $[M^0LT^{-3}]$
52. If magnitudes of two vectors be 3 and 4 and value of their scalar product is 6.the angle between them is
a. 30^0 b. 45^0 c. 60^0 d. 90^0
53. Stars appears to move from east to west because
a. all stars move from east to west .
b. the earth rotates from west to east .
c. the earth rotates from east to west
d. the back ground of the stars moves from west to east
54. To avoid the slipping while walking on ice one should take smaller steps because of the
a. larger friction b. smaller friction
c. large normal reaction
d. smaller normal reaction
55. A scooter of mass 120kg is moving with a uniform velocity of 108km/hr. The force required to stop the velocity in 10 sec is
a. 360N b. 720N
c. 180N d. 90N
56. In Young s double slit experiment the distance of tenth bright fringe from the center of interference pattern on either side is 3.44cm the slit separation if the screen is at 2m for wave length 589nm is
a. 0.24mm b. 0.44mm
c. 0.34mm d. 0.64mm
57. Up thrust depends upon
a. shape of the body
b. depth from the liquid surface
c. volume of liquid displaced
d. mass of the body
58. Two copper rods of equal length and unequal diameters are heated through the same range of temperature .Its increase in length will be
a. more in thin rod b. more in thick rod
c. same in both rod d. uncertain
59. The mean free path of a gas varies with pressure (p) as
a. P b. P^{-1} c. P^2 d. P^{-2}
60. The boiling of water inside the pressure cooker is
a. 0^0C b. 100^0C
c. 120^0C d. -120^0C
61. The path of a ray of light coming from air passing through a rectangular glass slab traced by four students are shows as A ,B , C ,and D in figure. Which one of them is correct?



(a) A (b) B (c) C (d) D

62. The image of a distant object formed by a far sighted person is
a. at the retina b. behind the retina
c. in front of retina d. no image is formed
63. The charge in uniform motion produces
a. an electric field only
b. a magnetic field only
c. both electric and magnetic field
d. neither electric nor magnetic
64. In order to increase the capacity of parallel plate capacitor one should introduce between the plates a sheet of
a. tin b. copper
c. steel d. mica
65. The self-inductance of a coil is 5 mH. If current of 2A is flown , what will be the magnetic flux through the coil ?
a. 1.000 weber b. 0.100 weber
c. 0.010 weber d. 0.001 weber
66. A 100W/220V bulb is used in a line of 440V. IT s power will be
a. 50W b. 100W
c. 200W d. 400W
67. The electric field intensity at the surface of charged conductor is
a. zero b. Infinite
c. directed tangentially to the surface
d. directed normally to the surface
68. In a non-resonant circuit what will be the nature of the circuit for frequencies higher than the resonant frequency?
a. resistive b. capacitive
c. inductive d. passive
69. The material used for permanent magnet has
a. high resistivity , high coercively
b. low retentivity ,low coercivity
c. low retentivity ,high coercivity
d. high retentivity , high coercivity
70. The angle of dip is the angle
a. between the vertical component of earths magnetic field and magnetic meridian
b. between the vertical component of earths magnetic field and geographic meridian
c. between Earths magnetic fields direction and horizontal direction
d. between the earths magnetic meridian and geographic meridian
71. If an electron has initial velocity in a direction perpendicular to the direction of electric field , the path of an electron is
a. straight line b. parabola
c. circle d. ellipse
72. The Planck’s constant can be experimentally determined by
a. spectroscopic experiments

b. tangent galvanometer experiment
c. compound pendulum experiment
d. photo-electric experiment.

73. When electrons are accelerated by 50 KV and 0.4% of energy of cathode rays is converted into x-rays and heat is evolved at 600 W. The current is
a. 0.12 A b. 0.012 A
c. 0.024 A d. 2.4 A

74. The difference between $92U^{235}$ and $92\ U^{238}$ atom is
a. $92U^{238}$ contain 3 more protons
b. $92U^{238}$ contain 3 more protons and electrons
c. $92U^{238}$ contains 3 more neutrons
d. $92U^{238}$ contain 3 more neutrons and 3 more electrons

75. In the depletion layer of an unbiased p-n junction diode, there are
a. only electrons b. only holes
c. both electrons and holes
d. only fixed ions

Chemistry ($25 \times 1 = 25$)

76. The number of molecules in 32 g of oxygen is
a. 3.2×10^{23} b. 6.02×10^{23}
c. 3.2×10^{16} d. 6.02×10^{10}

77. In a given atoms no two electrons can have the same values for all the four quantum numbers. This is called
a. Pauli's exclusion principle b. Hund's rule
c. Aufbau principle d. Uncertainty principle

78. The Shape of SF_6 molecule based on VSEPR theory is
a. linear b. square planar
c. octahedral d. trigonal bipyramidal

79. Which is not the isotope of hydrogen?
a. Protium b. deuterium
c. tritium d. fullerene

80. The composition of brown ring in nitrate test is
a. $FeSO_4.NO$ b. $FeSO_4.NO_2$
c. $FeSO_4.NO_3$ d. $FeSO_4.N_2O$

81. The formula of hypo is
a.$Na_2S_2O_3$ b. $Fe\ SO_4.NO_2$
c. $FeSO_4.NO_3$ d. $Fe\ SO_4.N_2O$

82. $MgSO_4.7H_2O$ is known as
a. bleaching powder b. quicklime
c. Epsom salt d. plaster of Paris

83. Minamata disease was caused by consumption of fish containing
a. zinc b. cadmium
c. arsenic d. mercury

84. Which element can not be detected by Lassaigne's test?
a. Fluorine b. Sulphur
c. chlorine d. nitrogen

85. Which of the following reagents can distinguish alkyne form alkane?
a. Fehling's solution b. ammoniac silver nitrate c. Bayer's reagent d. Lucas reagent

86. The Catalyst used in Friedel Craft's alkylation reaction is
a. Finely dividend nickel
b. Cuprous halide
c. Anhydrous $AlCl_3$ d. $Conc. H_2SO_4$

87. Urea is an
a. Nitrogenous fertilizer b. Phosphatic fertilizer
c. Potash fertilizer d. none of the above

88. IUPAC name of acetone is
a. 2- butanone b. 3-pentanone
c. Propan-2-one d. ethanol

89. Equivalent weight of sulphuric acid is equal to its
a. mol.wt./5 b. mol. Wt./4
c. mol.wt. /3 d. mol. wt. /2

90. The rate of reaction is independent of
a. Molecularity b. temperature
c. particle size of reactant
d. concentration of reactants

91. Which law of thermodynamics is illustrated by the statement "The total amount of energy in the universe remains constant"?
a. second law b. first law
c. third law d. none of the above

92. An example of organophosphate insecticides is
a. DDT b. BHC
c. Malathion d. dieldrin

93. Which of the following is not true for aniline?
a. gives coupling reaction
b. reacts with aldehyde
c. typical aromatic amine
d. does not give coupling reaction

94. Ethyl alcohol of 100 percent purity is called
a. absolute alcohol b. rectified sprit
c. denatured alcohol d. all of the above

95. Haloalkane when heated with sodium metal in presence of ether as solvent give alkanes. This reaction is know as
a. Reimer- Tiemann reaction
b. Wurtz reaction
c. Carbylamine reaction
d. kolbe's reaction

96. Which is not true for ketones?
a. do not reduce Tollen's reagent
b. do not reduce Fehling solution
c. reduce Tollen's reagent
d. do not reduce Benedict solution

97. CO_2 is a
a. Lewis base b. Bronsted acid
c. Bronsted base d. Lewis acid

98. Metal used for galvanizing iron sheet is
a. Zinc b. copper
c. cadmium d. cobalt

99. Which of the following compound is called lunar caustic?
a. Ag_2S b. $AgNO_3$
c. $Ag\ Cl$ d. Ag_2O

100. Which of the following is the strongest acid?
a. CH_3COOH b. $ClCH_2COOH$
c. Cl_3CCOOH d. $Cl_2CHCOOH$

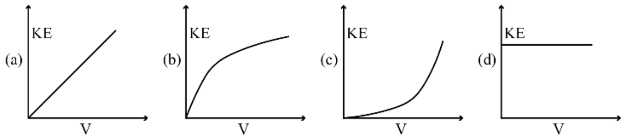
Tribhuvan University
Institute of Science and Technology
4 Years Bachelor in Computer Science and Information Technology (BSc. CSIT)
Entrance Examination 2079

Full Marks: 100
Time: 2 hrs.

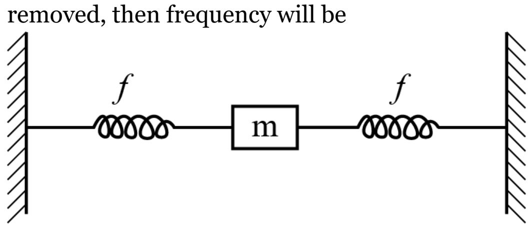
Attempt all questions:

Physics($25 \times 1 = 25$)

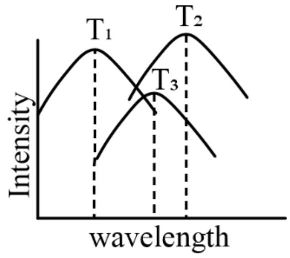
1. A quantity x is related by $x = \frac{\pi}{3}(a^2 - b^2)h$ where a, b and h are lengths, then quantity x is
   a. length b. velocity c. area d. volume
2. A vector is multiplied by -2 then
   a. direction reverses and unit changes
   b. direction reverses and magnitude is doubled
   c. direction remains unchanged but unit changes
   d. neither direction reverses nor unit changes but magnitude is doubled.
3. A stone is dropped from a height of 45 m. The distance travelled by it during its last second is
   a. 5 m b. 10 m c. 25 m d. 50 m
4. A projectile is broken into two pieces at the maximum height. Then its
   a. momentum increases
   b. momentum decreases
   c. kinetic energy increases
   d. kinetic energy decreases
5. Jet plane is based on the conservation of
   a. mass b. energy
   c. linear momentum d. angular momentum
6. Which of the following possesses highest viscosity?
   a. water b. blood
   c. glycerin d. honey
7. The graph of kinetic energy (KE) of a body versus velocity (V) is represented as



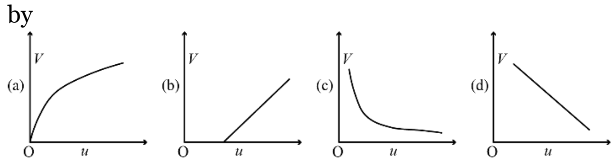
8. A mass m is attached with two identical spring as shown in the figure, has frequency f. If one of the spring is removed, then frequency will be



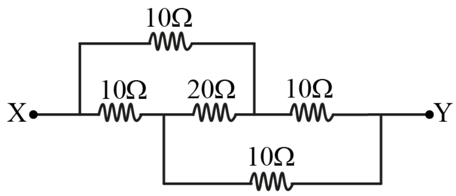
   a. f b. $2f$ c. $f\sqrt{2}$ d. $f l\sqrt{2}$
9. A metal sheet has a circular hole in it. When it is heated, diameter of the hole
   a. increases
   b. decreases
   c. remains unchanged
   d. First increases and then decreases
10. The mean free sheet path of a gas varies with pressure p as
    a. p b. p^{-1} c. p^{-2} d. p^2
11. A body initially at 80^oC cools to 64^oC in 5 minutes and to 52^oC in 10 minutes. The temperature of the body after 15 minutes will be
    a. 35^0C b. 30^oC c. 25^oC d. 20^oC
12. Light of wavelength 550 nm falls normally on a slit of width 22 * 10^{-7}m, the angular position of second minima form central maxima will be
    a. 14.5° b. 42° c. 30° d. 62°
13. The variations of intensity with wavelength at different temperature as shown in the figure will be



    a. $T_1 > T_2 > T_3$ b. $T_1 > T_3 > T_2$
    c. $T_2 > T_3 > T_1$ d. $T_3 > T_2 > T_1$
14. A completely transparent material will be invisible in vacuum when refractive index μ is
    a. unity b. more than unity
    c. less than unity d. infinity
15. For as convex mirror, the variation of u and v is given by



16. Sweetness of sound depends upon its
    a. wavelength b. periodicity
    c. periodicity and regularity
    d. amplitude
17. A parallel plate capacitor is charged and the battery is then disconnected. If the plates of capacitors are removed further apart by means of insulating handles
    a. The charge on capacitors increases
    b. The voltage across the plate increases
    c. The capacitance increases
    d. The energy stored decreases
18. The equivalent resistance between the points x and y is



    a. 10 Ω b. 20 Ω c. 3 0Ω d. 40 Ω
19. A magnetic needle kept in a non-uniform magnetic field. It experiences
    a. Torque but not a free
    b. Neither a force nor a torque
    c. Force and a torque
    d. A force but not a torque
20. A source of 34 V and 50 Hz is connected in series with coil of 17 mH and resister. If potential difference across

resister is 10V. The potential difference across the coil is
a. 12 V b. 16 V c. 28 V d. 32 V

21. A strong argument for particle nature of cathode rays is that they
a. Produce fluorescence
b. Travel through vacuum
c. Get deflected by electric and magnetic field
d. Cast shadow

22. When objects placed in a room are exposed to X-rays, they appear
a. Invisible b. Yellow c. Blue d. Red

23. Which series of Hydrogen atom lies in the infrared region ?
a. Lyman b. Balmer c. Pfund d. H-alpha

24. When boron $5B^{10}$ is bombarded by neutron, alpha particles are emitted. The resulting nucleus has the mass number
a. 11 b. 7 c. 6 d. 15

25. In P-type semiconductor, the majority and minority charge carries are respectively
a. Protons and electrons
b. Electrons and protons
c. Electrons and holes
d. Holes and electrons

Chemistry (25 × 1 = 25)

26. The weight of sodium carbonate required to prepare 1000 mL of its Deci normal solution is
a. 0.53 g b. 5.3 g c. 0.053 g d. 5.6 g

27. The concept of pH was introduced by
a. Arrhenius b. Lewis
c. Bronsted d. Sorensen

28. The rate of a chemical reaction increases with
a. increase in particle size of the reactants
b. increase in temperature
c. decrease in temperature
d. decrease in concentration of reactants

29. A spontaneous change is one in which the system has
a. an increase in internal energy
b. lowering of entropy
c. lowering of free energy
d. no energy change

30. Which of the following is an example of transition metal?
a. cobalt b. potassium
c. magnesium d. silicon

31. Which of the following compound is called blue vitriol?
a. Cu_2O b. $CuSO_4.5H_2O$ c. $CuCl_2$ d. Cu_2Cl_2

32. Silver is extracted from its sulphide ore by
a. contact process b. down's process
c. cyanide process d. ostwald's

33. 2,4-Dichlorophenoxyacetic acid (2,4-D) is generally used as
a. a herbicide b. an insecticide
c. a fungicide d. none of the above

34. A class of organometallic compounds of magnesium with the general formula $RMgX$ (where, R is an organic group and X is a halogen atom) is known as
a. Tolle's reagent b. Nessler's reagent
c. Schiff's reagent d. Grignard's reagent

35. Aldehydes can be distinguished from ketones by
a. Fehling's solution b. conc. H_2SO_4
c. Grignard's reagent d. Pyragallol

36. Picric acid is obtained by the nitration of
a. aniline b. phenol
c. benzene d. benzoic acid

37. Which of the following compound is used as anaesthetic?
a. ethylene b. ethyl alcohol
c. chloroform d. acetylene

38. Aromatic carboxylic acid is
a. formic acid b. acetic acid
c. stearic acid d. cinnamic acid

39. Which of the following compound is called urea?
a. NH_2CONH_2 b. NH_2COONH_4
c. $H_2NNHCONH_2$ d. $H_2NCOHC_2H_5$

40. Ethyne reacts with alkaline $KMnO_4$ solution to give
a. glyoxal b. oxalic acid
c. ethanoic acid d. acetic acid

41. IUPAC name of acetaldehyde is
a. menthanal b. propogane
c. ethanal d. butanal

42. Which is the most toxic chemical forms of mercury?
a. Hg b. Hg_2^{2+} c. Hg^{2+} d. CH_3Hg^+

43. The number of molecules in 32 g of oxygen is
a. 6.02×10^{23} b. 6.02×10^{9}
c. 3.2×10^{23} d. 3.2×10^{16}

44. The outermost electronic configuration of chromium is
a. $3d^2 4s^2$ b. $3d^5 4s^1$
c. $3d^5 4s^2$ d. $3d^6 4s^2$

45. Which of the following has the lowest ionic radius?
a. o^{2-} b. F^- c. Al^{3+} d. Na^+

46. Which of the following hydrogen halides has the lowest dipole moment ?
a. HF b. HCl c. HBr d. HI

47. The value of universal gas constant (R) is SI unit is
a. $8.314\, joule\, K^{-1} mol^{-1}$
b. $5.314\, joule\, k^{-1} mol^{-1}$
c. $3.501\, joule\, K^{-1} mol^{-1}$
d. $8.314 * 10^7 ergs\, K^{-1} mol^{-1}$

48. An example of acidic oxide is
a. HCL b. HBr c. HF d. HI

49. The iconic character is H-X bond is highest in
a. HCl b. HB_r c. HF d. HI

50. Which of the following compounds is called magnesia?
a. $MgSO_4 7H_2O$ b. $MgCl_2 6H_2O$
c. $MgCl_2$ d. $Mg(OH)_2$

English (15 × 1 = 15)

51. The word 'headland', gets its prime stress on:
a. 1^{st} syllable b. 2^{nd} syllable
c. 3^{rd} syllable d. none

52. pick out the word or group of words which has nearly the same meaning as the word "headland",
a. highland b. flatland
c. promontory d. marshy land

53. ..pick out the word or group of words which has nearly the same meaning as the word "remarkable",
a. good b. astonishing

c. commendable d. notable

54. Pick out the word or group of words which has nearly the opposite meaning as the word “pompous”,
a. showy b. wealthy
c. convincing d. humble
55. Pick out the word or group of words which has nearly the opposite meaning as the word “reciprocal”,
a. obstinate b. unilateral
c. mutual d. imaginary
56. Writing with correct spelling is:
a. orthography b. homograph
c. telegraph d. lithography
57. Choose the correct word order in the expression “we…cruelty,…tyranny and … a flatterer .”
a. hate, abhor, loathe b. abhor, hate, loathe
c. loathe, hate, abhor d. abhor, loathe, hate
58. Belief that god is nature :
a. Henotheism b. polytheism
c. pantheism d. deism
59. Choose correct preposition for the given expression “For a week she lived … banana and milk as she believed … the prescription of her doctor.”
a. at, on b. on, in
c. in, on d. on, on
60. Choose correct prepositions for the given expression “I am scared… loss …. my business but keen …. Gambling.”
a. in, of, on b. on, in, of
c. in, on, of d. of, in, on
61. Pick up the correct phrasal verb for the expression: “I was the son of sailors and …. Stories of the sea.”
a. reared on b. reared off
c. brought on d. pot on
62. Pick up the correct phrasal verb for the expression… “when does school…. For the summer vacation?”
a. Break out b. breakup
c. break off d. put on
63. Give the exact meaning of the idiomatic expression: “Bright and breezy”
a. in very sad mood
b. in very active mood
c. in a cheerful mood to do things quickly
d. in a decisive mood
64. Give the exact meaning of the idiomatic expression: “Go by the board”
a. plans discontinued and abandoned
b. plans in action
c. with a new plane
d. no plan for sometime
65. Use correct conditional expression in the expression: " You must go tomorrow …you are ready or not."
a. if b. even if
c. unless d. whether

General IT (10 × 1 = 10)

66. MS-Word is an example of
a. An operating system
b. A processing device
c. Application software
d. An input device
67. A computer cannot "boot" if it does not have the
a. Compiler b. Loader
c. Operating system d. Assembler
68. By default, your documents print in ……. mode.
a. Landscape b. Portrait
c. Page Setup d. Print View
69. Ctrl, Shift and Alt are called ……… keys.
a. modifier b. function
c. alphanumeric d. adjustment
70. Storage which stores or retains data after power off is called
a. Volatile storage b. Non-volatile storage
c. Sequential storage d. direct storage
71. What are the four things needed to connect to the internet?
a. telephone line, modem, computer, and an ISP
b. modem, computer, PDA, and ISP.
c. telephone line, modem, computer, and PDA
d. computer, ISP, modem, and communication software
72. Which process refers to the starting up of a computer and the loading of there quired parts of the operating system into the RAM?
a. Booting b. Tagging
c. Swiping d. Mapping
73. In the context of a word document, the term gutter stands for
a. the blank page inserted in between two filled pages
b. the space left on the left side for rough work
c. the space between two paragraphs
d. the space left on one side for stitching and binding
74. Programs stored in ROM are called as
a. Fireware b. Formware
c. Farmware d. Firmware
75. Select the correct statement from the following statements.
A. MS-Excel creates workbooks, and each workbook may contain more work sheets.
B. A worksheet in MS-Excel 2000 package has a maximum of 256 columns and 65536 rows.
C. Columns are identified by a number and rows are identified by a letter.
D. Cells are identified by the column letter and the row number.
a. A, B, C b. B, C, D
c. C, D, A d. A, B, D

Mathematics $(25x \times 1 = 25)$

76. A sentence $x + 7 = 5$ is
a. false statement b. true statement
c. not a statement d. a statement
77. If P and Q are the nonempty sets and $P \subset Q$ then
a. $P \subset \overline{Q}$ b. $\overline{Q} \subset \overline{P}$
c. $P \cap Q = \phi$ d. $P \supset Q$
78. If$|x - 3| = 7$ then
a. {10, -4} b. [10, -4]
c. {-8,4} d. (10, -4)
79. $\sqrt{-1}$ is
a. an integer number b. a prime number
c. an irrational number d. a complex number
80. The range of the function f(x)=$\sqrt{9 - x^2}$ is
a. (-3,3] b. [0,3]
c. (0,3) d. {0,2}

81. The function $f(x) = \sin x + x$ is
a. even function b. period function
c. odd function d. neither even nor odd
82. If x, y and z are in A.P. then
a. x + y = z b. y + z = 2x
c. x – z =2y d. x + z = 2y
83. The determination of the matrix A = [-3] is
a. 3 b. not possible c. -3 d. 0
84. If $x - iy = (5+2i)^2$ then (x, y) is
a. (21, 20) b. (21, -20)
c. (-21, 20) d. (-21, -20)
85. If in a triangle ABC, the angle are in A.P. then angle B=
a. 30° b. 45° c. 120° d. 60°
86. The area of triangle ABC is
a. $2bc \sin a$ b. $bc \sin A$
c. $\frac{1}{2}bc \sin A$ d. $\frac{1}{2}ac \sin A$
87. Equation of a line perpendicular to the line $2x + 3y + 5 = 0$ is
a. $3x - 2y + 7 = 0$ b. $2x - 3y + 7 = 0$
c. $-3x - 2y - 7 = 0$ d. $-2x - 3y + 7 = 0$
88. The two lines represented by $ax^2 + 4xy + 2y^2 = 0$ are perpendicular to each other for a =
a. 0 b.-2 c.2 d. 1
89. Equation of tangent (3,4) to the circle $x^2 + y^2 = 25$ is
a. $3x - 4y = 25$ b. $3x + 4y = -25$
c. $4x + 3y = 25$ d. $3x + 4y = 25$
90. The unit vector 3i+4j is
a. $i + j$ b. $\frac{1}{5}(3i - 4j)$
c. $\frac{1}{5}(3i + 4j)$ d. $\frac{1}{5}(i + j)$
91. the scalar product of two vectors $3i - 4j$ & (3i + 4j) is
a. 6 b. -7 c. 0 d. -7i
92. 92. probability of getting an even number while rolling a dice is
a. 0 b.1/3 c. ¼ d. ½
93. $\lim_{x\to 3} \frac{x^3-27}{x-3}$
a. 3 b. 9 c.27 d. 0/0
94. The value of x for which $\frac{dy}{dx} = 0$, for $y = x^3 - 3x^2$ are
a. 0,0 b. 0,2 c. 0, -2 d. 0,3/2
95. If $y = e^{\log x^2}$ then $\frac{dy}{dx} =$
a. 2x b. yx c. $2x/y$ d. $e^{\log x^2}$
96. The point of inflection of $y = x^3 - x^2$ is
a. 3 b. 0 c.1/3 d. 1
97. $\int_0^1 3x^2 ex^3 dx =$
a. e-1 b. e c. 0 d. e^3
98. Area bounded by x- axis and the curve $y = x^2$ and the lines $x = 0$ and $x = 4$ is
a. 64 b. 16 c. 16/3 d. 64/3
99. If $f(x) = x^2 + 5$, then the approximate value of f '(2) with x = 0.1 is
a. 6 b. 4.1 c. 9.2 d. 2
100. If two forces P and Q, P> Q, are acting at a point of a body, in the same direction, then the resultant force is
a. P – Q b. P + Q c. PQ d. Q – P

Tribhuvan University
Institute of Science and Technology
4 Years Bachelor in Computer Science and Information Technology (BSc. CSIT)
<u>Entrance Examination 2080</u>

Full Marks: 100
Time: 2 hrs.

Attempt all questions:

Group A Mathematics (25 × 1 = 25)

1. A sentence which is a 'statement' is
a. What is your name? b. 100 is a number
c. Pokhara is far away
d. Fewa Lake is in Kathmandu.
2. If $|x - 5| = 7$, then x =
a. $\{12, -2\}$ b. $[-2,12]$
c. $(-2,12)$ d. none
3. If $f(x) = 3x - 2$ for $x \in R$, then $f^{-1}(7) =$
a. 0 b. 1
c. 3 d. −2
4. The range of the function $f(x) = \sqrt{x-3}$ is
a. $(-\infty, 0)$ b. $[0, \infty)$
c. $[3, \infty)$ d. $(3, \infty)$
5. The function $f(x) = x^4 + 5$ is symmetrical about
a. origin b. x-axis
c. both x and y axes d. y-axis
6. If a, b, c, d... are in G.S, then 1/a, 1/b, 1/c, 1/d are in
a. G. S. b. H. S.
c. A.S. d. none
7. If $A = \begin{bmatrix} 2 & 5 \\ 3 & 7 \end{bmatrix}$, then $A^{-1} =$
a. $\begin{bmatrix} -2 & -5 \\ -3 & -7 \end{bmatrix}$ b. $\begin{bmatrix} 7 & -5 \\ -3 & 2 \end{bmatrix}$
c. $\begin{bmatrix} -7 & 5 \\ 3 & -2 \end{bmatrix}$ d. $1/\begin{bmatrix} 2 & 5 \\ 3 & 7 \end{bmatrix}$
8. If A is a square matrix, then the matrix $A + A^T$ is
a. square b. symmetric
c. diagonal d. skew symmetric
9. If one root of a quadratic equation is $\frac{1}{3+\sqrt{5}}$, then the quadratic equation is
a. $x^2 - 6x + 1 = 0$ b. $x^2 - 6x - 1 = 0$
c. $4x^2 - 6x - 1 = 0$ d. $4x^2 - 6x + 1 = 0$
10. The least positive integer k which will reduce $\left(\frac{i-1}{i+1}\right)^k$ to a real number is
a. 2 b. 1
c. 3 d. 4
11. If $\tan^{-1}2x + \tan^{-1}3x = \pi/4$, then $x =$
a. $1/6, 2$ b. $1/6, -1$
c. $0, 1$ d. $1/6, 0$
12. If $\sin^2 x = 1/2$, then for $n \in Z, x =$
a. $n\pi \pm \pi/4$ b. $n\pi \pm \pi/3$
c. $n\pi + \pi/4$ d. $n\pi + (-1)^n \pi/4$
13. The points on the y-axis at distance of $\sqrt{2}$ units from the line $x + y = 1$, are
a. (0, -1) and (0, −3) b. (0, 1) and (0, -3)
c. (0, 1) and (0, 3) d. (0, -1) and (0, 3)
14. The equation $kx^2 + xy - y^2 + 2x - y = 0$, represents a pair of lines if $k =$
a. 0 b. 2

c. 1 d. none

15. If the direction cosines of line are 2, 3, -6, then its direction cosines are;
a. $\frac{2}{7}, \frac{-3}{7}, \frac{-6}{7}$ b. $\frac{-2}{7}, \frac{3}{7}, \frac{-6}{7}$
c. $\frac{-2}{7}, \frac{-3}{7}, \frac{-6}{7}$ c. $\frac{2}{7}, \frac{3}{7}, \frac{-6}{7}$

16. If the three no zero vectors $\boldsymbol{p}, \boldsymbol{q}, \boldsymbol{r}$ are expressed as, $x\boldsymbol{p} + y\boldsymbol{q} + z\boldsymbol{r} = 0$ and x, y, z are scalars then the vectors are linearly independent if
a. $x \neq 0, y \neq 0, z \neq 0$ b. $x = 0, y \neq 0, z \neq 0$
c) $x = 0, y = 0, z = 0$ d. none

17. While two dice are thrown, the probability of getting the sum less than four is
a. 1/18 b) 1/12
c. 1/6 d. 1/9

18. $\lim_{x \to 0} \frac{tanx + 4x}{x}$
a. 5 b. 0/0
c. 4 d. 1

19. If $y = loge^{sin}(3x^2)$, then $\frac{dy}{dx} =$
a. $loge^{sin}(3x^2)$ b. $e^{sin}(3x^2)$
c. $6x\ sin\ (3x^2)$ d. $6x\ cos3x^2$

20. The points of inflection of the curve $x^4 - 6x^2 + 8x$ are:
a. 1, 2 b. 2, −1
c. 1. −1 d. 0, 1

21. $\int_0^{\pi/2} cosx\ e^{sinx}\ dx =$
a. e − 1 b. e
c. e +1 d. 1

22. The estimate of $\int_1^2 x^2$ dx using the Rectangle Rule with one interval is
a. 1.5 b. 3.2
c. 3.3 d. 3.375

23. The function $f(x) = x^2 + x - 4$ defined in [1, 4] has
a. roots b. no roots
c. one root d. none

24. If a force of $10N$ is inclined 45° to the horizon, then resolved part of the force in vertical direction is
a. $5N$ b. $\sqrt{2}N$
c. $5\sqrt{2}\ N$ d. $10N$

25. A ball is projected up an inclined plane with a velocity of $20\ m/sec$. If the inclination of the plane to the horizontal is 30° and acceleration due to gravity is $10\ m/\sec^2$, then the length described before coming to rest is
a. $20\ m$ b. $30\ m$
c. $200\ m$ d. $40\ m$

Group B Physics (25 × 1 = 25)

26. Joule x second is the unit of
a. Energy b. Momentum
c. Angular momentum d. Power

27. In equation, $\vec{F} = q\ (\vec{v} \times \vec{B})$ the quantity $\vec{F}$ is
a. Perpendicular to $\vec{v}$ only
b. Perpendicular to $\vec{B}$ only
c. Perpendicular to both $\vec{v}$ and $\vec{B}$
d. Perpendicular to q and $\vec{B}$

28. Two balls of the same mass are shot upwards one after another at an interval of 2 seconds along the same vertical line with the same initial velocity of $40\ m/s$. They were collide at a height of
a. $75\ m$ b. $80\ m$
c. $30\ m$ d. $45\ m$

29. Cricketer *Sompal Kami* hits a cricket ball at 45° to horizontal with a kinetic energy K. The kinetic energy of ball at highest point of path is
a. 0 b. $K/2$
c. $\frac{k}{\sqrt{2}}$ d. K

30. The maximum value of static friction is called
a. Rolling friction b. Limiting friction
c. Maximum friction d. Dynamic friction

31. India has become the first country to successfully land a spacecraft Chandrayaan−3 near the south pole of the Moon. Its rover has confirmed the presence of
a. Oxygen and Sulphur
b. Hydrogen and Oxygen
c. Sulphur and Nitrogen
d. Nitrogen and Water

32. A girl is sitting in a boat which is floating in *Fewa Lake*. If she drinks water from the lake, the level of water in the lake will be
a. Increased
b. Decreased
c. Remain unchanged
d. May increase or decrease depending upon the weight of the girl

33. Fire alarm work on the principle of
a. Volume expansion of solid
b. Volume expansion of water
c. Volume expansion of gas
d. Bimetallic bar which become curve on heating

34. During 5 − 12 September 2023, temperature at noon is recorded the same at the base camp of Mount Everest. A climber feels hottest when the relative humidity is
a. 99% b. 50%
c. 30% d. 10%

35. A microscope is focused on an 'ink mark'. A glass plate is placed over the spot. In order to focus the spot, microscope is to be raised 1 m. In order to focus scratch on upper surface it must be raised 2 m further. The refractive index of glass is
a. 1.33 b. 1.50
c. 1.62 d. 1.80

36. Decrease in aperture of a lens changes
a. Position of the image
b. Size of the image
c. Intensity of the image
d. Both position and size of the image

37. Sound travels in rocks in the form of
a. Longitudinal elastic wave
b. Transverse elastic wave
c. Both longitudinal and transverse elastic waves
d. Stationary wave

38. If radii of a solid and hollow sphere are same. Which can hold greater number of charges?
a. Solid sphere
b. Hollow sphere
c. Both will hold equal charges

d. Charge storing capacity depends upon surface temperature

39. To draw maximum current from a combination of cells, the cells be grouped as
a. series
b. parallel
c. mixed
d. both (a) and (b).

40. Two parallel wires carrying currents in the same direction attract each other because of
a. Potential difference between them
b. Mutual inductance between them
c. Electric forces between them
d. Magnetic forces between them

41. An emf of 2 volt is produced in a coil when current changes at steady rate from $3\ to\ 2$ amperes in 1 milli-second. The value of self-inductance is
a. 0
b. $2\ mH$
c. $20\ mH$
d. $2\ H$

42. In L-C-R circuit, potential difference between terminals of inductance is 60 volts, between terminals of condenser (or capacitor) is 30 volts, and between terminals of resistance is 40 volts. The supply voltage will be equal to
a. $130\ volts$
b. $70\ volts$
c. $50\ volts$
d. $10\ volts$

43. The magnetic field of Earth is due to
a. Motion and distribution of materials in and around the Earth
b. Interaction between cosmic rays and surface of the Earth
c. A strong magnetic dipole is believed to be buried at the center of the Earth
d. Strong induction effect of the Sun

44. A free charged particle moves through a magnetic field. The particle may undergo a change in
a. speed
b. energy
c. pressure
d. direction of motion

45. The speed of electron in first Bohr orbit of Hydrogen atom is v. The speed of electron in the first excited state of doubly ionized Lithium atom is
a. $v/2$
b. v
c. $1.5v$
d. $2v$

46. What is nuclear *'holocaust'*?
a. Formation of a nuclear bomb
b. Formation of nuclear reactor
c. Making hole in the nuclear shielding layer
d. After math of a nuclear explosion

47. Oppenheimer is a 2023 biographical drama film written and directed by Christopher Nolan and starring Cillian Murphy as J. Robert Oppenheimer a physicist. His scientific contribution is
a. Nuclear Reactor Physics
b. AK-47 Rifle
c. Bullet Dynamics
d. Design of Atom Bomb

48. A GM counter gives $82\ counts/sec$. After $210\ seconds$ the count rate decreased to $19\ counts/sec$. The background count is $10\ counts/sec$, then the half life of the source is
a. $40\ s$
b. $70\ s$
c. $105\ s$
d. $210\ s$

49. The truth table given below is for:

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

a. NOT gate
b. OR gate
c. NOR gate
d. AND gate

50. NPN transistors are preferred to PNP transistors because they have
a. Low cost
b. Low dissipation of energy
c. Capable of handling larger power
d. Electrons have high mobility than holes and hence high mobility of energy

Group C Chemistry ($25 \times 1 = 25$)

51. The law of conservation of mass was developed by
a. Antoine Laurent de Lavoisier
b. Joseph Louis Proust
c. John Dalton
d. Niels Bohr

52. The actual electronic configuration of copper is
a. $[Ar]3d^9 4s^2$
b. $[Ar]3d^{10}\ 4s^1$
c. $[Ar]3d^8\ 4s^2$
d. $[Ar]3d^7\ 4s^2$

53. The most electronegative element in the periodic table is
a. chlorine
b. oxygen
c. fluorine
d. nitrogen

54. The shape of NH_3 molecule is
a. square planar
b. linear
c. tetrahedral
d. pyramidal

55. The number of water molecules associated with copper sulphate is
a. 5
b. 7
c. 2
d. 10

56. Brass is a/an
a. metalloid
b. alloy
c. non-metal
d. alkali metal

57. The compound formed during the ring test for nitrate is
a. $FeSO_4.NO_2$
b. $Fe(NO_3)_3$
c. $FeSO_4.NO$
d. $Fe(NO_3)_2$

58. Kipp's apparatus is used for the preparation of
a. Cl_2
b. SO_2
c. CO_2
d. H_2S

59. The metal ion present in chlorophyll is
a. Mg^{2+}
b. Ca^{2+}
c. Ba^{2+}
d. Cu^{2+}

60. Tetrahedral structure of carbon was proposed by
a. Linus Pauling
b. van't Hoff and Le Bell
c. Robert Corey
d. James Waston

61. Haber's process is used for the manufacture of
a. sulphuric acid
b. nitric acid
c. ammonia
d. sodium hydroxide

62. Benzene was isolated first by

a. Berzelius b. Cavandish
c. Wohler d. Faraday

63. Prussian blue is
a. $Fe_4[Fe(CN)_6]_3$ b. $Na_4[Fe(CN)_6]$
c. $Fe(CNS)_3$ d. $Na_2[Fe(CN)_5NO]$

64. Which of the followings is related to Uranium series?
a. $4n$ b. $(4n + 2)$
c. $(4n + 1)$ d. $(4n + 3)$

65. An example of condensation polymer is
a. polystyrene b. teflone
c. bakelite c. polyvinyl chloride

66. Which is correct for transition elements?
a. exhibit inert pair effect
b. have low melting points
c. do not show catalytic activity
d. exhibit variable oxidation states

67. Corrosive sublimate is
a. $HgCl_2$ b. Hg_2Cl_2
c. HgI_2 d. HgO

68. The major product of reaction between ethanol and potassium dichromate in presence of sulphuric acid is
a. CH_3COCH_3 b. CH_3COOH
c. $HCHO$ d. $CH_3COOCH_2CH_3$

69. IUPAC name of formic acid is
a. ethanoic acid b. propanoic acid
c. methanoic acid d. butanoic acid

70. Ammonical silver nitrate solution is known as
a. Baeyer's reagent b. Schiff's reagent
c. Fehling's solution d. Tollen's reagent

71. The reduction of nitrobenzene in neutral medium gives
a. phenyl hydroxylamine b. aniline
c. hydrazobenzene d. all of the above

72. The reaction of ketone with Grignard's reagent gives
a. primary alcohol b. tertiary alcohol
c. secondary alcohol d. carboxylic acid

73. Which of the followings is not a primary standard substance?
a. $(COOH)_2$ b. $K_2Cr_2O_7$
c. $KMnO_4$ d. $NaCl$

74. The factor which does not influence the rate of reaction is
a. concentration b. temperature
c. nature of reactants d. molecularity

75. An intensive property is
a. density b. mass
c. volume d. enthalpy

Group D English ($25 \times 1 = 25$)

76. Pick out the word or group of words which has nearly the same meaning as the word "predicament".
a. modest b. ignorance
c. future d. quandary

77. Pick out the word or group of words which has nearly the same meaning as the word "preferment".
a. demotion b. preference
c. promotion d. rectify

78. Pick out the word or group of words which has nearly the same meaning as the word "gainsay".
a. save b. deny
c. comment d. punish

79. Pick out the word or group of words which has nearly the opposite meaning as the word "morbid".
a. healthy b. happy
c. sick d. passive

80. Pick out the word or group of words which has nearly the opposite meaning as the word "esteem".
a. honour b. insult
c. happy d. pardon

81. Choose a correct single word for the expression " belief that God is unknowable".
a. atheism b. monism
c. agnosticism d. nihilism

82. Choose a correct single word for the expression " false reasoning intended to deceive".
a. Pluralism b. hedonism
c. pacifism d. sophism

83. Pick up the correct phrasal verb for the expression " I ..... because I wasn't sure of the way he would react".
a. hold back b. hold on
c. hold off d. hold out

84. Pick up the correct phrasal verb for the expression" I told the children to take their football and... ".
a. clear up b. clear off
c. clear in d. clear out

85. Pick out most appropriate preposition/s to fill up the blanks." The defeated warrior surrendered...the enemy and waited...the verdict".
a. with, for b. to, for
c. in, on d. from, for

86. Pick out most appropriate preposition/s to fill up the blanks." Engineers proceed... one site to another ...quick supervision and attend business".
a. for, for b. to, on
c. from, for d. on, on

87. Pick out most appropriate preposition/s to fill up the blanks." everybody winks ...one's fault and laughs... others errors.
a. on, at b. on, on
c. at, for d. at, at

88. Give appropriate meaning of the idiomatic expression "to carry the day"
a. to be victorious b. to feel shame
c. to speak truth d. to stop work

89. The word " prosecution" gets its prime stress on :
a. 3rd syllable b. 2nd syllable
c. 4th syllable d. 1st syllable

90. Find appropriate conditional expression to fill up the blank space in " we will follow him ...he would drive more slowly".
a. in case b. even if
c. if only d. but for

Group E Computer Related GK ($25 \times 1 = 25$)

91. What does the acronym 'GPT' stand for in ChatGPT?
a. Generative Pre-trained Transformer
b. Global Policy Tracker
c. Graphical Information Technology
d. General Purpose Tool

92. What type of operating system MS-DOS is?
a. Command Line Interface

b. Graphical User Interface
c. Multitasking
d. Menu Driven Interface

93. What is the full form of VGA?
a. Video Graphics Array
b. Visual Graphics Array
c. Volatile Graphics Array
d. Video Graphics Adapter

94. Which of the following is the common language for Artificial Intelligence?
a. Python b. Java
c. Julia d. Scala

95. For what purpose AI is used in Chandrayaan-3?
a. Data analysis during the launch
b. Landing safely on the moon's surface
c. Maintaining the power
d. Programming

96. Which of the following devices is used in the network layer?
a. Application Gateway b. Switch
c. Router d. Reapers

97. How many bytes does 4 kilobytes represent?
a. 512 b. 1024
c. 4096 d. 8192

98. Which of the following values is the correct value of this binary code 1011 and 1111?
a. 11 and 14 b. 12 and 15
c. 11 and 15 d. 12 and 14

99. What is the ".BAT" extension?
a. System file b. Backup file
c. Storage file d. None of these

100. Identify the first computer virus among the following.
a. Blaster b. Cripper
c. Sasser d. Mydoom

Tribhuvan University
Institute of Science and Technology
4 Years Bachelor in Computer Science and Information Technology (BSc. CSIT)
Entrance Examination 2081

Full Marks: 100
Time: 2 hrs.

Attempt all questions:

English (15 × 1 = 15)

1. Choose the word or phrase opposite meaning to the given word “reciprocal”.
a. rash b. unilateral
c. recovery d. prompt

2. Chose the word or phrase opposite in meaning to the given “nimble”.
a. Lazy b. jest
c. mix d. active

3. Chose the word or phrase similar in meaning to the given word “Swelter”
a. Swing b. stifling
c. swerve d. sweep

4. Choose the word or phase similar in meaning to the word “parody”.
a. irony b. laughing
c. comedy d. lampoon

5. Choose the word or phase similar in meaning to the given word “Swill”.
a. neat b. boil
c. rinse d. shout

6. Choose the single word to the expression “a interested in the study of ancient things”.
a. Antiquarian b. ascetic
c. optimist d. amiable

7. Choose the single word to expression “false reasoning intended to deceive”.
a. monism b. sophism
c. atheism d. pacifism

8. Pick up the correct phrasal verb to the given expression, “Despite war threat people........their business as usual”
a. go on b. go off
c. go about d. go ahead

9. Pick up the correct phrasal verb to the given expression. “He...... and Finished cleaning the house with in an hour”.
a. set out b. set on
c. set to d. set up

10. Choose the right meaning to the idiomatic expression “a rough patch”
a. easy going b. foolish idea
d. success d. time trouble

11. Choose the right meaning to the idiomatic expression “spread like wild fire”.
a. spread quickly and to all parts (humors)
b. run very fast
c. treat
d. good memory

Fill in the prepositions in blank spaces.

12. He has good ear... music but stick... grammar
a. in..in b. at..in
c. by...on d. for...with

13. Fill in the right preposition is in blank spacels. He has good ear.... Music but sick ..... grammar exercise

a. for.........for b. of.......of
c. for......of d. on......by

14. Fill in the right prepositions in blank spacels "I"m interested...... cricket but I'm not very good...it"
a. in.......in b. at.....at
c. for....with d. in....at
15. The word "xy lophone" has it's prime stress on...
a. 1st syllable b. 2nd syllable
c. 3rd syllable d. none

Physics ($25 \times 1 = 25$)

16. The quantity having no dimension is,
a. Mass b. Velocity
c. Angle d. Pressure
17. A vector is multiplied by 2, then
a. direction reverses and unit change.
b. direction reverses and magnitude is doubled.
c. direction remains unchanged but unit changes.
d. neither direction reverses nor unit changes but magnitude is doubled
18. The horizontal range is $4[3]^{1/2}$ times the maximum height in a projectile motion. The angle of projection is
a. 15° b. 30° c. 45° d. 60°
19. The slope of kinetic energy versus position vector gives the rate of
a. kinetic energy b. momentum
c. potential energy d. acceleration
20. The work done to blow a soap bubble of radius "R" is W, then work done to increase radius from R to 3R is
a. $2w$ b. $4w$ c. $8w$ d. $9w$
21. A boy is carrying a bucket of water in one hand and a piece of plastic in other hand. If he transfers plastic in bucket which floats, Then the boy feels
a. same load
b. more load
c. less load
d. depends upon density of plastic
22. Fire dram works on principle of
a. Volume expansion of solid.
b. Volume expansion of water.
c. Volume expansion of gas.
d. Bimetallic bar which becomes curved on heating.
23. The critical angle of light passing from glass to air is minimum for
a. red b. violet
c. green d. yellow
24. A stone is dropped into a well $78.4m$ deep. The splash sound is noticed after (velocity of sound in air is 350 m/s)
a. $2.4s$ b. $3.6s$
c. $4.2s$ d. $6.8s$.
25. Latent heat of substance is zero at
a. boiling point b. melting point
c. critical temperature d. freezing point
26. Two fixed charges q and $4q$ are r distant apart. What will be the position of third charge to be placed so that the system will be in equilibrium?
a. 2r/3 from 4q b. $\frac{r}{2}$ from q
c. 2r from q d. r/2 from 4q
27. Two lens of power rq and $-7.rw$ are place in contact the equivalent focal length of combination will be.
a. -40 cm b. -25cm
c. +40cm d. +25cm
28. Whenever the magnetic flux linked with a coil changes, there is emf induced in a circuit. The emf lasts
a. for a short time
b. forever
c. for a long time
d. 80 long as the change in flock takes place
29. In LCR circuit, the inductive reactance at resonance frequency is 100Ω and resistance is 5 Ω the quality factor of circuit is.
a. 5000 b. 20 c. 500 d.95
30. At a point on the axis of an electric diploe
a. The electric field E is Zero.
b. The electric potential r is zero.
c. Neither V nor E is zero.
d. both E and V are zero
31. A circuit contains a capacitor of 420 H and inductance L. The value of "L" to broadcast on radio 1020 KHZ is.
a. $2.8 \times 10^{-5}H$ b. $r.8 \times 10^{-r}H$
c. $7.6 \times 10^{-5}H$ d. $9.6 \times 10^{-6}H$
32. At neutral temperature the thermoelectric power is
a. Maximum b. Minimum
c. Infinite d. Zero
33. The study of photoelectric effect is useful in understanding
a. quantization on energy
b. quantization of charge
c. conservation of charge
d. conservation of energy
34. The kinetic energy carried by emitted electron depends on
a. frequency b. work carried
c. intensity d. momentum
35. A nucleus reactor has a power of 10 kw if the energy per fission is 200 Mev then the number of fission per second is
a. 5×10^{17} b. 5×10^{15}
c. 5×10^{16} d. 5×10^{14}
36. The half-life of radioactive sample is 10 years. It means life is
a. 12.43 years b. 14.43 years
c. 16.43 years d. Same as half life
37. NPN transistors are most preferred than that of PNP transistor. It is become of
a. Low Cost
b. Low dissipation of energy
c. capable of handling low power
d. Electrons have high mobility than holes
38. Induced emf produced across the axle is maximum when it moves
a. at the poles
b. at the equator
c. remains stationary
d. no emf induced at all
39. Atomic power station at Gujrat has a generating capacity of 200mw. What will be the energy released in a day by the station?
a. 1.43×10^{13} j b. 1.53×10^{13} j
c. 1.63×10^{13} j d. 1.73×10^{13} j
40. If germanium is doped with donor impurity the donor atom should be
a. tetravalent b. trivalent
c. pentavalent d. quatravalent

Chemistry ($25 \times 1 = 25$)

41. Benzene molecule is
a. planar b. trigonal
c. pyraruidal d. tetrahandral
42. Ethanol and diethyl ether are
a. Positional isomers b. metameres

c. Chainisomres d. functional isomers

43. The function of myoglobin is
 a. Storage of oxygen
 b. Storage of metalions
 c. Transport of oxygen
 d. all of the above
44. Bronze is an alloy of
 a. $Cu\&zn$ b. Cu &Sn
 c.$Fe\&$ $Carbon$ d. zn & Fe
45. The reaction of $Conc. HNO_3$ with iron gives.
 a. $Fe(NO_3)_3$ b. Fe_2O_3
 c. Fe_3O_4 d. $Fe(NO_3)_2$
46. PbO is an example of
 a. amphoteric oxide b. neutral Oxide
 c. acidic Oxide d. basic Oxide
47. Oxidation number of CL in $NaClO_3$ is
 a. 0 b. -1
 c. +5 d.+1
48. The Shape of PCl_5 molecule based on VSEPR theory is
 a. Octahedral b. trigonal bipyramidal
 c. trigonal planar c. Pentagonal bipyramidal
49. According to IUPAC classification of elements noble gas are placed in group
 a. 18 b. 17
 c. 3 d. 2
50. The principle quantum number of an atom is related to the
 a. Shape of subshell
 b. size of the shell
 c. Orien tation of the orbitals
 d. Spain of the electron
51. The number of molecules in $32.0g$ of Oxygen gas is
 a. 6.023×10^{23} b. 3.023×10^{21}
 c. 6.023×10^{22} d. 6.023×10^{20}
52. A mixture containing camphor & sand can be Separated by
 a. Crystallization b. filtration
 c. sedimentation d. Sublimation
53. Titration bet Silver nitrate & Sodium chloride is called
 a. Complex metric titration
 b. Precipitation titration
 c. redox titration
 d. acid base titration
54. Ostwald's dilution law is applied for the ionization of
 a. NH_4Cl b. $NaOH$
 c. NH_4OH d. $NaCl$
55. The unit of first Order rate Constant is
 a. $time^{-1}conc^{-1}$ b. $time\ conc^{-1}$
 c. $conc. time^{-1}$ d. $time^{-1}$
56. The apparatus used for the experimental determination of heat of a reaction is called
 a. Calorimeter b. thermometer
 c. colorimeter d. voltmeter
57. The eq^n used to calculate the emf of an electrochemical cell is
 a. Boltzmann eq^n b. Henderson's eq^n
 c. Nernst eq^n d. Ostwald's eq^n
58. Which of the following acid has highest boiling point?
 a. $HCOOH$ b. CH_3COOH
 c.C_2H_5COOH d. C_3H_7COOH
59. Talen's regent is
 a. ammoniacal Silver nitrate Sol^n
 b. ammonical Silver bromide
 c. ammonical Cuprous Chloride
 d. ammonical cuprous oxide
60. Picric acid is obtained by the nitration of
 a. aniline b. benzene
 c. phenol d. benzoic acid
61. When Chloroform is heated with zinc dust and water it gives:
 a. CH_4 b. CH_2Cl_2
 c. C_2H_4 d. C_2H_6
62. Cinnabar is ore of
 a. Fe b. Cu c. Hg d. Zn
63. N_2O gas is evolved when copper reacts with
 a. conc HNO_3
 b. dilute HNO_3
 c. Moderately conc NHO_3
 d. hot and conc HNO_3
64. The number of unpaired electron present in 3d-orbital of $Fe^{3+} Ion$ is
 a. 4 b. 3 c. 5 d. 6
65. Gypsum used in cement manufacturing process acts as
 a. retarder b. accelerator
 c. plasticizer d. both a and b

Mathematics (25 × 1 = 25)

66. A first degree equation x and y always represents a
 a. Circle b. Straight line
 c. par of straight line d. parabola
67. If $|y - 3| \leq 7$, then
 a. $-4 \leq y \leq 10$ b. $-2 \leq y \leq 5$
 c. $-2 \leq 2y \leq 5$ d. $-4 \leq y \leq 4$
68. For any two non-empty sets A and B, A-B =
 a. $A \cup B$ b. $A \cap B$
 c. $A \cap \bar{B}$ d. $B \cap \bar{A}$
69. If $f(x) = 1 - x$ then f of $f(x)$
 a. $(1 - x)^2$ b. $1 - x$
 c. $1 + x$ d. x
70. The function $f(x) = x + 2x^3$ is
 a. even
 b. odd
 c. both even and odd
 d. neither odd or even
71. The sum of the infinite series $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} \ldots \ldots$
 a. does not exit b. O
 c. $\frac{2}{3}$ d. none
72. if A= $\begin{bmatrix} 1 & x+2 \\ 2x+2 & 3 \end{bmatrix}$ is a symmetric then x=
 a. 1 b. 2 c. O d. does
73. If W is the root of unity, then $\begin{bmatrix} 1 & w & w^2 \\ w & w^2 & 1 \\ w^2 & 1 & w \end{bmatrix}$=
 a. 1 b. 2 c. 0 d. w
74. The imaginary part of $\frac{2i^2}{(1+i)^2}$
 a. 0 b. 2 c. $-i$ d. 1
75. The value of k for which one root of the equation $px^2 - qx + k = 0$ is reciprocal of the other is
 a. q b. –p c. p d o

76. If $4\cos^2 x - 1 = 0$, then for $n \in z, x =$
a. $n\pi \pm \frac{\pi}{3}$ b. $-\frac{\pi}{3}$ c. $n\pi + \frac{\pi}{3}$ d. $\frac{\pi}{3}$
77. $2\cos^{-1} x =$
a. $\cos^{-1}(2x^2 - 1)$ b. $\cos^{-1}(x^2 - 1)$
c. $\cos^{-1}(1 - 2x^2)$ d. $\cos^{-1} x^2$
78. The point on the x-axis at distance of 5 units from the line $3x + 4y = 8$
a. (8,0) b. (11,0)
c. (0,11) d. (0,8)
79. If the angle between the lines represented by $kx^2 + xy - y^2 = 0$ *is* $90°$, then k =
a. 1 b. 2 c. 5 d. 6
80. The distance of a point (3,5,9) from yz plane is ,
a. 9 b. 5 c. 3 d. 17
81. The two vectors $i + 3k + j$ and $3i + nk + 3j$ are collinear if n=
a. 0 b. 3 c. 1 d. 9
82. A distribution is symmetrical if
a. Mean> Median > mode
b. Mean < Median < Mode
c. Mean = Median = Mode
d. Mean = Median
83. While two coins are tossed once, the probability of getting two tails is
a. $\frac{1}{2}$ b. $\frac{1}{4}$ c. $\frac{3}{4}$ d. $\frac{1}{3}$
84. $\lim_{x\to 0} \frac{sin2x+4x}{x}$
a. 6 b. 0 c. $\frac{0}{0}$ d. 5
85. If $y = e^{\log(\sin(x^2))}, then \frac{dy}{dx} =$
a. $xy\ tab\ x^2$ b. $2xy\ xotx^2$
c. $2xtanx^2$ d. $2xlotx^2$
86. The function $x^3 - 12x + 8$ has maximum at x =
a. -2 b. 2 c. 0 d. 8
87. $\int_1^2 \frac{\cos(\log x)}{x}\, dx$
a. $-\sin(\log 2)$ b. $-\cos(\log 2)$
c. $\sin(\log 2)$ d. 0
88. The Equation $f(x) = 0$ has at least one root in (a, b) where $f(x)$ is continuous in (a, b) if
a.$f(a)\, f(b) > 0$ b. $f(a)\, f(b) < 0$ c. $f(a)f(b) = 0$ d. $f(a)\, f(b) \geq 0$
89. Magnitude of the two forces P and Q Will be maximum when the both force act
a. In opposite direction
b. $90°$ *to each other*
c. 45 ° to each other
d. in the same direction
90. If a body thrown vertically upward with a velocity of $40ms^{-1}$ from the top of a tower, hits the ground after 10 second , then the height of the tower is $[g = 10ms^2]$
a. 200m b. 130m
c. 100m d. 40m

General IT ($10 \times 1 = 10$)

91. What is the Scientific name of the computer?
a. Homo silicon b. Homo Digitalis
c. Homo Computatrix d. Silico sapiens
92. What terms describe the action of code scrambling?
a. Encryption b. obfuscation
c. Segmentation d. Aggregation
93. In 1999, the Melissa virus was widely publicized which is
a. Internet meme b. E-mail virus
c. Music album d. Online shopping trend
94. What term refers to the geometric arrangement of devices on a network?
a. Architecture b. Topology
c. Configuration d. Infrastructure
95. What is the personal computer operating system that organizes and uses a graphic desktop environment?
a. DOS b. Linux
c. Windows d. Masos
96. In the context of computer memory what does DMA Stand for?
a. Data Manipulation Algorithm
b. Direct Memory Access
c. Digital Media Adapter
d. Dynamic Memory All
97. What is the name of an application program that gather user information and sends it to someone through the internet?
a. Antivirus b. firewall
c. Spybot d. Browses
98. Which type of file is created by the excel program
a. Document file
b. data file
c. Portable document format file
d. workbook file
99. Text or graphics while copying is temporarly store in
a. Clipboards b. cache
c. RAM d. ROM
100. A computer conolled device for tanning exercise duplicating the work environment is called
a. Accumulator b. simulator
c. Network d. pre-Accumulate