

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

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 $n(A \cup B)=80$, 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 $\operatorname{cosec} x = -1$, then the value of x is
a. $2n\pi$ 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 value of $\operatorname{Det} A$ 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 $\lim_{x \rightarrow 0} \frac{\sin x^\circ}{x}$ 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 $\overline{A \cup B} =$
a. $A \cup B$ b. $\bar{A} \cap \bar{B}$

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- 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 $(x^2 + \frac{a^2}{x^2})^3$ 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. $\frac{\vec{i} + \vec{j} - 2\vec{k}}{\sqrt{6}}$
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. 1st syllable b. 2nd syllable
 c. 3rd 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 word or group of words 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 ownerdanger but to a student a teacher should warnerrors..
 a. for ,to b. of , against
 c. to , against d. about for
35. I am sympathetic.... Those students who are not satisfiedtheir 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 word "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 methe 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

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48. Although they are not rich, they always wear.....clothes

- a. respectful b. respective
c. respectable d. respected

49. This ischosen 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. $[M^0 L T^3]$ b. $[M L^0 T^3]$
c. $[M^0 L^0 T]$ d. $[M^0 L T^{-3}]$

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° b. 45° c. 60° d. 90°

53. Stars appear 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 background 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 wavelength 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

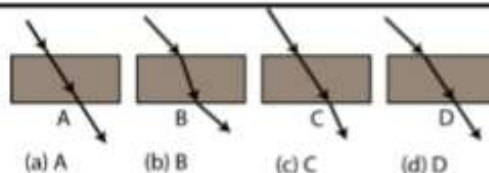
59. The mean free path of a gas varies with pressure (p) as

- a. P b. P^{-1} c. P^2 d. P^{-2}

60. The boiling of water inside the pressure cooker is

- a. $0^\circ C$ b. $100^\circ C$
c. $120^\circ C$ d. $-120^\circ C$

61. The path of a ray of light coming from air passing through a rectangular glass slab traced by four students are shown as A, B, C, and D in figure. Which one of them is correct?



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. Its 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 coercivity
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 earth's magnetic field and magnetic meridian
b. between the vertical component of earth's magnetic field and geographic meridian
c. between Earth's magnetic field's direction and horizontal direction
d. between the earth's 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

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- 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 $^{92}\text{U}^{235}$ and $^{92}\text{U}^{238}$ atom is
a. $^{92}\text{U}^{238}$ contain 3 more protons
b. $^{92}\text{U}^{238}$ contain 3 more protons and electrons
c. $^{92}\text{U}^{238}$ contains 3 more neutrons
d. $^{92}\text{U}^{238}$ 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 × 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. $\text{FeSO}_4 \cdot \text{NO}$ b. $\text{FeSO}_4 \cdot \text{NO}_2$
c. $\text{FeSO}_4 \cdot \text{NO}_3$ d. $\text{FeSO}_4 \cdot \text{N}_2\text{O}$
81. The formula of hypo is
a. $\text{Na}_2\text{S}_2\text{O}_3$ b. $\text{FeSO}_4 \cdot \text{NO}_2$
c. $\text{FeSO}_4 \cdot \text{NO}_3$ d. $\text{FeSO}_4 \cdot \text{N}_2\text{O}$
82. $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ 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 from 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. $\text{Conc. H}_2\text{SO}_4$
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. AgCl d. Ag_2O
100. Which of the following is the strongest acid?
a. CH_3COOH b. ClCH_2COOH
c. Cl_3CCOOH d. Cl_2CHCOOH