

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. $\{2, \infty\}$ 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. $\pi/2$ c. π d. $-\pi$
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 n th term of the series: $1.3+3.5+5.7+\dots$ 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 $\operatorname{cosec}^2 x - 2 = 0$, then x is
 a. $\pm \pi/6$ b. $\pm \pi/4$ c. $n\pi \pm \pi/4$ d. $n\pi + \pi/2$
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. -1 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. $1/2$ b. -2 c. 2 d. 0

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18. $\lim_{n \rightarrow \infty} \frac{1+2+\dots+n}{n^2} =$
 a. $1/2$ b. 0 c. $1/n$ d. n
19. $\lim_{x \rightarrow 0} \frac{5x^2+4x \tan x}{x^2} =$
 a. 9 b. 0 c. 5 d. 4
20. If $y = \sqrt{x + \sqrt{x + \sqrt{x + \dots}}}$ then $\frac{dy}{dx} =$
 a. $2\sqrt{x}$ b. $\sqrt{3x}$ 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. $\frac{axy}{\sqrt{ax^2+b}} \cdot e^{\sqrt{ax^2+b}}$
 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. $1 - \cos(\ln 2)$ b. $\cos 2$
 c. $\cos(\ln 2)$ d. $1 + \cos(\ln 2)$
24. The critical points for $f(x) = x^3 - 3x$ are:
 a. ± 3 b. $\pm \sqrt{3}$ c. ± 1 d. 0, $\pm \sqrt{3}$
25. The area bounded by the x-axis and the curve $y = x^3$ and ordinates of $x = 2$ and $x = 4$ is
 a. 60 sq. 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 and 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. chiophobia b. ergophobia
 c. monomania d. hematophobia

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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 be
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 $3\mu F$ are connected in series. The net capacitance is
a. $1\mu F$ b. $(1/3)\mu F$ c. $3\mu F$ d. $9\mu F$
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. $\pi/2$ c. $\pi/4$ 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 BeF_2 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 bromate
 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. $\text{Scm}^2 \text{ equivalent}^{-1}$ b. Ohm. cm
 c. S cm^{-1} d. $\text{S cm}^2 \text{ mole}^{-1}$
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. $\Delta E = Q + W$ b. $\Delta G = \Delta H - T\Delta S$
 c. $G = H + TS$ d. $\Delta E = Q - W$
90. The unit of rate constant for third order reaction is
 a. S^{-1} b. $\text{mol}^{-2} \text{L}^2 \text{s}^{-1}$
 c. $\text{mol}^{-1} \text{LS}^{-1}$ d. $\text{mol L}^{-1} \text{s}^{-1}$
91. The reaction of benzene with alkyl chloride in presence of anhydrous AlCl_3 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. $\text{Pd} - \text{CuSO}_4$ b. $\text{Pd} - \text{CaSO}_4$
 c. $\text{Pd} - \text{CuCl}_2$ d. $\text{Pd} - \text{BaSO}_4$
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. $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$
 c. $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$ d. $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
100. Which is the most important ore of Zinc
 a. Zincite b. Zinc blende
 c. Framklinite d. Wilemite