TRIBHUVAN UNIVERSITY

Institute of Science & Technology (IoST)

BScCSIT Model Entrance Examination–2024

2081-4-12

Attempt all Questions

Choose the correct answer and blacken the appropriate bubble using gel pen on answer sheet.

Full Marks: 100 **Time:** 2 hour

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) $[-3, 7]$ 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) $A \cup B$
4. If $f(x) = 2x - 3$, then $f^{-1}(x) =$
   a) $(x + 3)/2$ b) $1/(2x - 3)$ c) $1/(3 - 2x)$ d) $1/(2x + 3)$
5. The period of the function $f(x) = \sin(45 + x)$ is
   a) 2π b) $\frac{\pi}{2}$ 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: $1.3 + 3.5 + 5.7 + \ldots$ 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 $\text{cosec}^2 x - 2 = 0$, then x is
   a) $\pm\frac{\pi}{6}$ b) $\pm\frac{\pi}{4}$ c) $n\pi \pm \frac{\pi}{4}$ d) $n\pi + \frac{\pi}{2}$
10. If $A = \begin{pmatrix} k & 2 & 0 \\ 2 & 0 & k \\ 0 & 2 & -1 \end{pmatrix}$ is a symmetric then k =
    a) 1 b) –1 c) –2 d) 2
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) 1 d) –1
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) $\frac{2}{5}$ d) $\frac{5}{2}$

16. The equation $x^2 - 2y + y^2 + 3x - 2 = 0$ 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) $\frac{1}{2}$ b) –2 c) 2 d) 0

18. $\lim_{n \to \infty} \frac{1 + 2 + ... + n}{n^2} =$

a) $\frac{1}{2}$ b) 0 c) $\frac{1}{n}$ d) n

19. $\lim_{n \to 0} \frac{5x^2 + 4x\tan x}{x^2} =$

a) 9 b) 0 c) 5 d) 4

20. If $y = \sqrt{(x + \sqrt{(x + \sqrt{(x + ...)})})}$ 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 $\frac{dy}{dx} =$

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) $\cos(\ln 2)$ 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 a-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

26. He rescued the wounded soldiers and helped

a) them b) him c) himself d) themselves

27. He cut ..... with a knife.

a) itself b) herself c) himself d) themselves

28. The leader, with his helpers ..... stolen the bags.

a) have b) has c) having d) were

29. Her husband and she ..... gone home.

a) has b) have c) having d) is

30. One should not mock at the poor, ... ?

a) shouldn't one b) should one c) should he d) shouldn't he

31. Those books are not yours, ... ?
    a) are they b) Aren't they c) are those d) Aren't yours
32. He lived in this city ..... ten years.
    a) for b) till c) to d) during
33. Sit ..... me.
    a) besides b) beside c) to d) between
34. Unless you use English, ...
    a) it will not improve b) It will improve
    c) it would improve d) It would not improve
35. 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.
36. He plays..... football.
    a) a b) an c) the d) No article
37. He went to ..... theatre.
    a) a b) an c) the d) No article
38. What is an antonym of 'sow'?
    a) spread b) reap c) grow d) take
39. What is an antonym of 'faulty'?
    a) flawless b) wrong c) faculty d) strong
40. What is a synonym of 'check'?
    a) test b) cheap c) attentive d) win
41. Which of the following pair have same dimension?
    a) L/R and CR b) LR and CR c) R/L and $[LC]^{1/2}$ d) CR and 1/LC
42. A bullet fired into a fixed target loses half of its velocity after penetrating 3cm, the further distance travelled before coming to rest is
    a) 4 cm b) 3 cm c) 2 cm d) 1 cm
43. The horizontal range is $4\sqrt{3}$ times the maximum height in a projectile motion. The angle of projection is
    a) 15° b) 45° c) 30° d) 60°
44. 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
45. If length of wire is doubled keeping the diameter constant, its Young's modulus will
    a) increases b) decreases
    c) remains same d) depends upon nature of matter
46. The work done to blow a soap bubble of radius 'R' is W, then work done to increase the radius from R to
    a) 2W b) 8W c) 4W d) 9W
47. 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

48. Latent heat of a substance is zero at
    a) boiling point b) critical temperature c) melting point d) freezing point
49. The average kinetic energy per degree of freedom per molecule of an ideal gas is
    a) KT b) 2KT c) $\frac{1}{2}$KT d) $\frac{3}{4}$KT
50. Two spheres of same material have radii in the ratio of 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
51. Light of wavelength 550 nm falls normally on a slit of width 22×10^{-7}, the angular position of second minima from central maxima will be
    a) 14.5° b) 30° c) 42° d) 62°
52. A person is in a room whose ceiling and two adjacent walls are mirrors. Number of images formed of an object is
    a) 5 b) 7 c) 6 d) 8
53. The refractive index is 1.414 and refracting angle is 60°, then minimum deviation of light will be
    a) 30° b) 60° c) 45° d) 72°
54. A sound wave has frequency 500 Hz and velocity 360 m/s. what is the distance between 2 particles having phase difference 60°?
    a) 0.7 cm b) 70 cm c) 1.2 cm d) 12 cm
55. Two fixed charges q and 4q are at r distance apart. What will be position 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
56. N-equal capacitors are first connected in series and then in parallel. The ratio of maximum and minimum capacitance is
    a) n^2 b) $1/n^2$ c) n d) 1/n
57. A heater coil is cut into two equal parts and only one part is used in the heater. How ill the heat generated vary?
    a) One fourth b) Doubled c) Halved d) Four times
58. A 50V battery is connected across 100 hm 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
59. A magnetic needle kept in a non-uniform magnetic 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
60. In LCR circuit, the inductive reactance at resonance frequency is 100 Hz and resistance is 5 Ohm, the quality factor of the circuit is
    a) 5000 b) 500 c) 20 d) 95
61. A circuit contains a capacitor of 420 Pf and an inductance L. The value of 'L' to broadcast radio at 1020 Khz is
    a) 2.8×10^{-5} H b) 7.6×10^{-5} H c) 5.8×10^{-5} H d) 9.6×10^{-6} H
62. Electron accelerated from rest to potential difference of 100 volt, its final velocity will be
    a) 5×10^5 m/s b) 3×10^6 m/s c) 4×10^5 m/s d) 6×10^6 m/s
63. When a proton collides with an electron, which of the following characteristics of proton increases?
    a) Energy b) Wavelength c) Frequency d) Impulse
64. The half life of a radioactive sample is 10 years. Its mean life is
    a) 12.43 years b) 16.43 years c) 14.43 years d) same as half life

65. NRN transistors are most preferred than that of PNP transistor. It is because of
    a) Low cost
    b) Capable of handling low power
    c) Low dissipation of energy
    d) High mobility of electrons than holes
66. 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
67. The intermediate product of markovnikov's addition reaction is
    a) Carbocation
    b) Free radical
    c) Carbanion
    d) All of above
68. Acetylene contains
    a) 2π and 3σ bond
    b) 3π and 2σ bond
    c) 2π and 4σ bond
    d) None of the above
69. Lewis acid and oxidizing agents are
    a) Electrophiles
    b) Nucleophiles
    c) Both a and b
    d) None of the above
70. Wurtz reaction cannot be used to prepare
    a) Methane
    b) Ethane
    c) Butane
    d) Hexane
71. Which of the following will show common ion effect
    a) HCl + HNO_3
    b) HCl + NaCl
    c) HCl + H_2S
    d) All of above
72. Carboxylic acid has the general formula of
    a) C_nH_{2n+2}
    b) $C_nH_{2n}O$
    c) $C_nH_{2n}O_2$
    d) $C_nH_{2n+2}O$
73. $C_6H_{12}O_6$ is the formula of
    a) Glucose
    b) Fructose
    c) Galactose
    d) All of them
74. The mass of product is equal to mass of reactants. It is
    a) Law of multiple proportion
    b) Low of definite proportion
    c) Law of conservation of mass
    d) Law of combining volume
75. Which of the following orbital has the highest energy level?
    a) 4d
    b) 3d
    c) 5s
    d) 4p
76. Oxidation state of oxygen in peroxide is
    a) 1
    b) –1
    c) –2
    d) 2
77. Potential of hydrogen electrode is
    a) Zero
    b) Positive
    c) Negative
    d) All of above
78. Which of the following has the largest size?
    a) Na
    b) Mg^{+}
    c) Al^{+++}
    d) All of above
79. The molarity of pure water is
    a) 0.018 M
    b) 18 M
    c) 50 M
    d) 55.55 M
80. Radioactive isotopes of hydrogen is
    a) Protium
    b) Deuterium
    c) Tritium
    d) All of the above
81. The catalyst used in the contact process is
    a) V_2O_5
    b) $Fe(OH)_3$
    c) CaO
    d) Fe
82. Chemical formula of white vitriol is
    a) ZnS
    b) $ZnSO_4.7H_2O$
    c) FeS
    d) $FeSO_4.7H_2O$
83. The type of bonding in protein is?
    a) Hydrogen bond
    b) Covalent bond
    c) Peptide bond
    d) All of above
84. The color of the dye is due to the presence of certain group containing multiple bonds called
    a) Chromophore
    b) Auxochrome
    c) Both
    d) None of the above

85. Molecular formula of calomel is
    a) $HgCl_2$ b) Hg_2Cl_2 c) $Hg + HgCl_2$ d) $Hg_2Cl_2 + Hg$
86. $FeSO_4$ forms brown ring with
    a) NO_3 b) NO_2 c) NO d) N_2O
87. Chalcopyrite is commonly known as
    a) Matte b) Lunar caustic c) Fool's gold d) None
88. How many structural isomers are possible for C_6H_{14}
    a) 3 b) 4 c) 5 d) 7
89. Rate of 1st order reaction depends upon
    a) time b) temperature c) conc. of reactant d) all of the above
90. Which of the following is the neutral oxide?
    a) CO_2 b) H_2O c) N_2O_3 d) ZnO
91. A key that uniquely identifies each record is called
    a) Primary key b) Key record c) Unique key d) Field name
92. Which of the following cannot be changed?
    a) IP b) MAC c) Subnet Mask d) DNS
93. Private LAN/MAN of an organization that is accessible to organizational users only is ...
    a) Internet b) Intranet c) Extranet d) All of these
94. Which is not a transmission media?
    a) Twisted Pair b) Telephone c) Coaxial Pair d) Modem
95. Wireless medium is also called ...
    a) Guided b) Unguided c) Unbounded d) Both B and C
96. Null is a Type of
    a) String b) Class c) Object d) Variable
97. Inside which HTML element do we put the JavaScript?
    a) <head> b) <script> c) <meta> d) <style>
98. Full form of UML is ....
    a) Unified modeling language b) Unified major language
    c) Ultimate modeling language d) None of above
99. Black box testing is also called .....
    a) White box testing b) Non-functional testing
    c) Functional testing d) None of above
100. Which is the most common LAN protocol?
    a) UDP b) Ehternet c) HTTP d) SMTP

...Best of Luck...

BScCSIT (Answers 2081-4-12)

1.b	2.d	3.c	4.a	5.a	6.a	7.c	8.d	9.c	10.d
11.c	12.b	13.a	14.c	15.a	16.d	17.c	18.a	19.a	20.d
21.a	22.d	23.a	24.c	25.a	26.a	27.c	28.b	29.b	30.b
31.a	32.d	33.b	34.a	35.d	36.d	37.c	38.b	39.a	40.a
41.a	42.d	43.c	44.b	45.c	46.d	47.a	48.b	49.c	50.c
51. b	52. b	53.a	54.d	55.a	56.a	57.b	58.d	59.b	60.c
61.c	62.d	63.b	64.c	65.d	66.c	67.a	68.a	69.a	70.a
71.d	72.c	73.d	74.c	75.a	76.b	77.a	78.a	79.d	80.c
81.a	82.b	83.d	84.a	85.b	86.c	87.c	88.c	89.d	90.b
91.a	92.b	93.b	94.d	95.d	96.c	97.b	98.a	99.c	100.b