

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 $q \in R$, is undefined if
 - a. $p \neq 0, q = 0$
 - b. $p = 0, q = 0$
 - c. $p \neq 0, q \neq 0$
 - d. $p = 0, q \neq 0$
2. $[a, b] =$
 - a. $\{x: a \leq x \leq b\}$
 - b. $\{x: a < x < b\}$
 - c. $\{x: a < x \leq b\}$
 - d. $\{x: a \leq x < b\}$
3. If $f: R \rightarrow R$ 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 $\sin(\cos^{-1} \frac{4}{5})$ 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. $n\pi$
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 $1-1/2+1/4-1/8 \dots$ 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. $[2(\cos 15^\circ + i \sin 15^\circ)]^6 =$
 - a. $64i$
 - b. 64
 - c. 0
 - d. $-64i$
14. $(1 + \omega + \omega^2)^3 + (1 + \omega - \omega^2)^3 =$
 - a. 16
 - b. 16ω
 - c. -8
 - d. $16\omega^2$
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. $-x - y = 2$

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19. $\lim_{x \rightarrow \infty} \frac{3x^2 + 2x - 5}{6x^2 + 4x - 7} =$
a. 2 b. 3 c. 5/7 d. 1/2
 20. $\lim_{x \rightarrow 0} \frac{1 - \cos ax}{x^2} =$
a. $\frac{a^2}{2}$ b. a^2 c. $2a^2$ d. $4a^2$
 21. If $x = t + \sin t$, $y = 1 - \cos t$ then dy/dx is
a. $\tan t$ b. $\tan t/2$ c. $-\tan t$ d. $-\tan t/2$
 22. The derivative of $\cos x$ w.r.t. $\sin x$ is
a. $-\tan x$ b. $\tan x$ c. $\cot x$ d. $-\cot x$
 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. $\cot x + C$ b. $-\cot x + C$ c. $\tan x + C$ d. $-\tan x + C$
 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 onsyllable.
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 schoolfor college children.
a. opens b. is opened
c. has to be opened d. be opened
 29. One who is fond 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 diecancer 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 spranga 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 currymy 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 (to his sister.)
a. Complement b. direct object
c. adjunct d. Indirect object
 41. The car needshood 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 atone.
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° b. 45° c. 90° d. 120°
 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 ($\alpha_{\text{steel}} = 11 \times 10^{-6}/K$)
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

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- 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, it 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° , 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. 6.25×10^{18} b. 6.25×10^{-19}
c. 1.6×10^{-19} d. 1.6×10^{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 heating
68. The torque on electric dipole of moment vector (p) when placed in an electric field 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 absolute 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 Å. 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
76. The number of atoms of carbon present in 25.0g of CaCO_3 is
a. 1.505×10^{23} b. 1.005×10^{23}
c. 1.205×10^{23} d. 1.303×10^{23}
77. The electronic configuration of chromium is
a. $[\text{Ar}]3d^5 4s^1$ b. $[\text{Ar}]3d^6 4s^2$
c. $[\text{Ar}]3d^7 4s^2$ d. $[\text{Ar}]3d^4 4s^2$
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's process is used for the extraction of
a. sodium b. sodium hydroxide
c. sodium carbonate d. ammonia
83. The IUPAC name of $\text{C}-(\text{CH}_3)_4$ 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. phthalic 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 substances 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. Brillestein's test
91. The reduction of aldehydes or ketones by amalgamated zinc and concentrated HCl to corresponding alkane is called as
a. Clemmensen reduction
b. Wolf-Kishner reduction
c. Cannizzaro's reduction
d. Perkin's reaction
92. Which of the following compound is most basic?
a. NH_3 b. CH_3NH_2
c. $(\text{CH}_3)_2\text{NH}$ d. $(\text{CH}_3)_3\text{N}$
93. The molecular formula of the white vitriol is

-
- a. $ZnSO_4 \cdot 7H_2O$ 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 HNO_3 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