B.Sc.CSIT Entrance Model Question

Full Marks: 100
Time: 2.00 hrs.

Attempt all question:

Mathematics $(25 \times 1 = 25)$

1. The proper subsets of A = $\{a, e, i, u\}$ are

(a) 4   (b) 15   (c) 16   (d) 0

2. If A = [-3, 1] and B = [-2, 3], then A-B is

(a) [-3, -2]   (b) (-3, -2)   (c) (-3, -2]   (d) [-3, -2)

3. If f: IR→ IR be defined by $f(x) = 5x - 7$, then $f^{-1}(x) =$

(a) $\frac{x+7}{5}$ (b) $\frac{x-7}{5}$ (c) $5x + 7$ (d) $\frac{5x+7}{5}$

4. The range of $f : LR \to LR$ defined by $f(x) : \sqrt{1 - x^2}$ is

(a) (-1, 1)]   (b) [0, 1]   (c) (0, 1)   (d) [0, 1)

5. Among the following functions the even function is

(a) $f(x) = x^3$ (b) $f(x) = x^2$ (c) $f(x) = sinx + x$ (d) $f(x) = cosx - x$

6. If $sin^2 x = 1$ then $x =$

(a) $n\pi + \pi$ (b) $n\pi + \pi/2$ (c) $n\pi \pm \pi/2$ (d) $\pm \pi/2 77$

7. Sum to infinity the sequence -5/4, 5/16, -5/64,... is

(a) -1   (b) 1   (c) 1/2   (d) 2

8. $\begin{vmatrix} k & 4 & 5 \\ 2 & 4 & 3 \\ 3 & 4 & 5 \end{vmatrix} = 0$ gives k=

(a) 3   (b) 0   (c) 2   (d) 2

9. If A= $\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$ then $A^n =$

(a) $\begin{bmatrix} n & n \\ 0 & n \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 1 \\ 0 & n \end{bmatrix}^*$ (c) $\begin{bmatrix} n & 1 \\ 0 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & n \\ 0 & 1 \end{bmatrix}$

10. If w is a cube root of unity, then $(1 + \omega - \omega^2)(1 - \omega + \omega^2) =$

(a) 0   (b) 1   (c) -1   (d) 4

11. $\frac{1+i}{1-i}$ can be expressed in the form

(a) $1 + i$ (b) $1 - i$ (c) $1 + i.0$ (d) $0 + i$

12. The quadroic equation whose one root is $5 + \sqrt{3}$ is

(a) $x^2 + 10x - 22 = 0$ (b) $x^2 - 10x - 22 = 0$

(c) $x^2 - 10x + 22 = 0$ (d) $x^2 + 10x + 22 = 0$

IOST, TU   Please blacken the correct answer on the Answer sheet.   1

13. The distance between the lines $3x+2y-6=0$ and $3x+2y-9=0$ is
   (a) $-3/\sqrt{13}$ (b) $3/\sqrt{13}$ (c) 0   (d) $\sqrt{13}$

14. The angles between the lines represented by $2x^2 + 3xy + y^2 + 5x + 2y - 3 = 0$ is

   (a) $tan^{-1}(1/3)$ (b) $tan^{-1}(1/2)$ (c) $tan^{-1}(\pm 1/3)$ (d) $tan^{-1}(\pm 1/2)$

15. Length of the tangent of the circle $x^2 + y^2 = 4$, from $(-2,-3)$ is
   (a) 3   (b) $\sqrt{13}$ (c) 13   (d) -3

16. $\displaystyle \lim_{x \to \infty} \frac{3x+5}{\sqrt{x^2+7}} =$
   (a) 0   (b) $\propto$ (c) ∞/∞ (d) 3

17. $\displaystyle \lim_{x \to 0} \frac{\log_e (1+x)}{x} =$
   (a) 0   (b) $0/0$ (c) 1   (d) -1

18. If $f(x) = \begin{cases} ax^2, & for\ x \le 2 \\ 3, & for\ x > 2 \end{cases}$
   is continuous at $x = 2$, then $a =$

   a) $3/4$ (b) $4/3$ (c) 3   (d) 4

19. If $y = e^{ln\ cos(x^2)}$, then $\frac{dy}{dx} =$
   (a) $-2xytanx^2$ (b) $2xytanx^2$
   (c) $2xycotx^2$ (d) $-2xycotx^2$

20. If $\sqrt{x} + \sqrt{y} = 5$, then dy/dx at $x = 1$ is
   (a) 3   (b) 4   (c) -4   (d) 5

21. The crital point of $y = \left(\frac{1}{x}\right)^x$ is
   (a) e   (b) $1/e$ (c) 0   (d) e^2

22. The Radius of sphere is increasing at a variable rate and is equal to 1cm/sec, when the radius is 3 cm. The rate of change in volume at this time is
   (a) $36\ \pi cu.\ cm/sec$ (b) $6\ \pi cu.\ cm/sec$
   (c) $4\ \pi cu.\ cm/sec$ (d) $36\ \pi^2 cu.\ cm/sec$

23. $\displaystyle \int \frac{xdx}{\sqrt{1+x}-\sqrt{1-x}} =$

   (a) $\frac{1}{3}(1+x)^{3/2} + \frac{1}{3}(1-x)^{3/2} + c$ (b) $\frac{1}{2}(1+x)^{1/2} + \frac{1}{2}(1-x)^{1/2} + c$

   (c) $\frac{1}{3}(1+x)^{3/2} - \frac{1}{3}(1-x)^{3/2} + c$ (d) $(1+x)^{3/2} + (1-x)^{3/2} + c$

24. $\displaystyle \int \frac{sinx}{1+cosx}dx =$

   (a) $ln\ (1 + cosx) + c$ (b) $ln\ (sinx) + c$
   (c) $- ln\ (1 + cosx) + c$ (d) $ln\ (1 - cosx) + c$

25. The area bounded by the curve $y = x^2$, x-axis and the lines $x = 0$ and $x = 4$ is

(a) $\frac{64}{3}$ 　　(b) 64 　　(c) $^{-64}/_3$ 　　(d) $^3/_{64}$

English 　　(25×1=25)

26. He is famous all the world ....

(a) about 　(b) after 　(c) by 　(d) over

27. They were charged .....receiving stolen goods.

(a) by 　(b) after 　(c) with 　(d) for

28. The word "Mythology" has the stress on ....syllable.

(a) first 　(b) second 　(c) third 　(d) fourth

29. All of them present in the meeting said let's go,.............?

(a) shall we? 　(b) do we? 　(c) will we? 　(d) won't we?

30. What is Verb word for the " Brief" which is a noun ?

(a) enbrief 　(b) abbreviate 　(c) briefen 　(d) brief

31. A person obsessed with exclusively one idea or subject :

(a)kleptomaniac 　(b) nymphomaniac 　(c) monomaniac

(d)bibliophile

32. Ships are made in ....

(a) quay 　(b) dock 　(c) harbor 　(d) dockyard

33. Give appropriate synonym to the word "Poltroon"

(a) peaceful 　(b) coward 　(c) brave 　(d) sane

34. Give appropriate opposite meaning word to " Torpor"

(a)dullness 　(b) inertness 　(c) vivacity 　(d) sluggishness

35. The word " Joy" has the same initial consonant sound as the word........

(a) gesture 　(b) zoo 　(c) grey 　(d)gnat

36. ....Whale is in danger of becoming extinct.

(a) a 　(b) the 　(c) an 　(d)none

37. Rajan drove his herd of ....to a new pasture.

(a) goat 　(b) sheep 　(c) cattle 　(d) bees

38. The word " hearted" takes the prefix..........

(a) up 　(b) down 　(c) over 　(d) under

39. " I saw a black bird" has ....tone.

(a) fall-fall 　(b)fall-rise 　(c) rising 　(d) falling

40. Which of the following is not used as a prefix?

(a) tyro 　(b) post 　(c) pre 　(d) anti

41. Which of the following word does not have -ic suffix?

   (a) history   (b) success   (c) class   (d) athlete

42. Never........ to any being in my surrounding.

   (a) had I harmed   (b) does I harm   (c) did I harm   (d) I harm

43. " He asked if I could help him", is a (n).........

   (a) complex sentence   (b) interrogative sentence
   (c) optative sentence   (d) indirect question

44. The ladies............English classes since 6th December.
   (a) were attending   (b) have attended
   (c) have been attending   (d) is attending

45. A book containing information on all subjects is ......
   (a) dictionary   (b) encyclopedia   (c) thesaurus   (d) glossary

46. The boss **brought matters to a head** by facing him to work more.

   (a) created an atmosphere of confrontation   (b) created a lot of
   unhappiness
   (c) brought matter to a decisive point   (d) made him unhappy

47. I have been betrayed by my own **flesh and blood.**
   (a) friends   (b) relatives   (c) children   (d) acquaintances

48. work for which no regular salary is paid

   (a) honorable   (b) honorary   (c) temporary   (d) ad hoc

49. The cat was killed by a truck which went ....it.

   (a) about   (b) through   (c) under   (d) over

50. The statue was.......heavy that a crane was brought to lift it.

   (a) very   (b) too   (c) so   (d) much

Physics   (25×1=25)

51. The angle of projection on which horizontal range and maximum height are equal is
   (a) 45°   (b) 60°   (c) 76°   (d) 36°

52. A solid sphere is roating in free space if the radius of sphere is increased keeping mass same then the quantity which is not affected is
   (a) momemt of inertia   (b) angular velocity   (c) angular
   momentum   (d)rotational K.E.

53. Eight drops of equal size are falling through air with steady velocity 10 cm/s coalesce to form a single drop then velocity of single drop will be
   (a) 80 cm/s.   (b) 40 cm/s.   (c) 50 cm/s.   (d) 20 cm/s.

54. A vessel at rest explodes breaking into three pieces. Two pieces having equal mass fly off perpendicular to one another with the same speed 30 ms^{-1}. If the third piece has three times the mass of each piece, the velocity of each piece will be
   (a) 14.4ms^{-1}.   (b) 10.0ms^{-1}.
   (c) 20.0ms^{-1}.   (d) 9.8ms^{-1}.

55. A body just sink in a liquid is slighty pressed and released then it will
   (a) start oscillating   (b) come to same position immediately
   (c) sink to bottom   (d) come to same position slowly

56. 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) 102°C.
   (c) 77°C.   (d) 127°C.

57. Bernoulli"s equation can be applicable only if
   (a)fluid is incompressible.   (b) fluid is compressible.
   (c) the viscuss force of the fluid is significant.
   (d) there is no streamline motion.

58.The temperature of the mixture if 2 kg of ice at-10°C is mixed with 10 kg of water at 50°c is about
   (a) -5°C .   (b) 27.5°C.   c) 0°C.   (d) 35.3°C.

59. A defraction grating 2 cm wide has 6000 rulings. The angular position of first maxima for light of wavelength 589 nm is
   (a) 10° .   (b) 42° .
   (c) 32° .   (d) 62° .

60. If Young's modulus for a material is zero, then the state of material should be
   (a) solid but powder.   (b) liquid but crystal.
   (c) gas but compressed.   (d) supersolid.

61. A ray of light is incident on a glass surface of refractive index 1.732 at polarizing angle. The angle of refraction of the ray is
   (a) 30° .   (b) 40° .   (c) 50° .   (d) 60°.

62. A survivor from a ship wreck sees a fish in the water. To catch it with her spear, she must
   (a) aim above the fish.   (b) aim infront of the fish.
   (c) aim below the fish.   (d) aim at the fish.

63. A solenoid has 5 layers of windings of 600 turns each that carries a current 10 A. The magnetic flux density at its center is
   (a) $3.77 \times 10^{-2} \frac{wb}{m^2}$.   (b) $2.77 \times 10^{-2} \frac{wb}{m^2}$.
   (c) $2.77 \times 10^{-3} \frac{wb}{m^2}$.   (d) $3.77 \times 10^{-3} \frac{wb}{m^2}$.

64. A 25 W, 220 V bulb and a 100 W, 220 V bulb are connected in parrllel across a 440 V line.
   (a) Only 100 watt bulb will fuse.   (b) Only 25 watt bulb will fuse.
   (c) Both bulbs will fuse.   (d)None of the bulbs will fuse.

65. A 10 eV electron is circulating in a plane at right angles to a uniform field of magnetic induction 10^{-47}, the orbital radius of electron is
   (a) 18 cm.   (b) 11 cm.
   (c) 16 cm.   (d) 9 cm.

66. A wire of resistance 12Ω is bent to form a circle. The effective resistance between the two points on any diameter of circle is
   (a) 12 Ω   (b) 6 Ω   (c) 9 Ω   (d) 3 Ω

67. In bringing an electron towards another electron, electrostatic potential energy of the system
    (a) decreases.   (b) remains same.   (c) increases.
    (d) becomes zero

68. The count rate of a Geiger-Muller counter for the radiation of a radioactive material of half life of 30 minutes decreases to 50 per sec after 2 hours. The initial count rate was
    (a) 25 per sec.   (b) 80 per sec.   (c) 600 per sec.   (d) 625 per sec.

69. When a fusion reaction converts a pair of hydrogen isotopes to an alpha particle and a neutron, most of the energy released is in the form of
    (a) gamma radiation.   (b) kinetic energy of the neutron.
    (c) kinetic energy of the alpha particle.
    (d) All of these about eqully.

70. The work function of sodium having thresold wavelength 6800 Angstrom is
    (a) 1.134eV.   (b) 1.827eV.   (c) 4.352eV.   (d) 2.672eV.

71. In a full wave rectifier the least number of diode required is
    (a) 5.   (b) 3.   (c) 4.   (d) 2.

72. Increasing the number of turns of wire on the secondary of a transformer will
    (a) increase the primary current.
    (b) increase the secondary current.
    (c) decrease the secondary current.
    (d) have no effect on the secondary current

73. The light emitted by LED depends on
    (a) high resistance used in it.   (b) a capacitor at the output
    (c) band gap of semoconductor.   (d) frequency of ac source in used.

74. In the middle of the depletion layer of a reverse-biased PN junction, the
    (a) potential is zero.   (b) potential is maximum.
    (c) electric field is zero.   (d) electric field is maximum.

75. When NPN transistor is used as an amplifier
    (a) holes move from base to emitter.
    (b) holes move from emitter to base.
    (c) electrons move from collector to base.
    (d) electrons move from base to collector.

Chemistry

(25×1=25)

76. DDT is an example of
    (a) fungicide   (b) herbicide
    (c) insecticide   (d) rodenticide

77. The chemical name of calomel is
    (a) mercurous chloride   (b) mercuric chlodide
    (c) mercuric thiocyanate   (d) mercuric iodide

78. polyvinyl chloride is an example of
    (a) condensation polymer
    (b) addition polymer
    (c) coordination polymer
    (d) none of the above

79. When phenol is heated with zinc powder it gives
    (a) benzene
    (b) cyclohexane
    (c)benzoic acid
    (d) cyclohexanol

80. $CHCl_3$ on oxidation with air gives
    (a) chloropicrin   (b) CCl_4 (c) formic acid   (d) phosgene

81. Which of the following is not the property of benzene?
    (a) colourless liquid with aromatic smell
    (b) soluble in water
    (c) biols at 80.4°C
    (d) vapour of benzene is highly toxic

82. The second order rate constant is usually expressed as
    (a) s^{-1} (b) $l\,mol^{-1}s^{-1}$
    (c) mol s $^{-1}$.   (d) $mol\,l^{-1}s^{-1}$

83. For an endothermic reaction ΔH is
    (a) positive   (b) negative
    (c) zero   (d) unpredictable

84. Galvanisation is a process which involves the coating of iron surface with
    (a) aluminium   (b) copper   (c) tin   (d) zinc

85. Which one of the following is not a Lewis base?
    (a)NH_3 (b) H_2O
    (c) Cl^- (d) BF_3

86. The indicator used for detection of end point in the titration of weak acid with strong base is
    (a) methyl orange   (b) methyl red
    (c) bromothymol blue   (d) phenolphthalein

87. The H-O-H bond angle in water is
    (a) 104° 27'   (b) 109° 28'
    (c) 107° 48'   (d) 102° 28'

88. Anti-Markovnikov's rule is also known as
    (a) peroxide effect
    (b) inductive effect
    (c) mesomeric effect
    (d) none of the above

89. Which of the following is a nucleophile?
    (a) BF_3
    (b)$AlCl_3$
    (c) CN^-
    (d) H_3O^+

90. The IUPAC name of formic acid is
    (a) ethanoic acid
    (b)propanoic acid
    (c) butanoic acid
    (d)methanoic acid

91. The molecular formula of Epson salt is
    (a) $MgSo4. 7H_2O$
    (b) $2 CaSo4. H_2O$
    (c) $CaOCL_2$
    (d) $CaSO4. \frac{1}{2} H_2O$

92. Galena is an ore of
    (a) Zinc   (b)lead
    (c) iron   (d) aluminium

93. The hybridization of carbon atom in graphite is
    (a) sp
    (b)sp^3
    (c) sp^3d^2
    (d)sp^2

94. Mn_2O_7 is an example of
    (a) basic oxide   (b) acidic oxide
    (c) neutral oxide   (d)amphoteric oxide

95.Which of the following alkali metal is most reactive?
    (a)Cs
    (b) Rb
    (c) Na
    (d) K

96. The compound containing both ionic and covalent bond is
    (a) CH_4
    (b) CCl_4
    (c) KCN
    (d) KCL

97. The uncertainty principle was first discoverd by
    (a) Pauli
    (b) de-Broglie
    (c) Heisenberg
    (d)Planck

98.The oxidation number of N in NH_4^+ is
    (a) -4   (b) -3
    (c) -2   (d) -1

99. The number of moles in 11.2 litres of nitrogen gas at STP is
    (a) 0.5   (b) 0.4
    (c) 2.0   (d) 0.8

100. Glucose is
    (a) an aldose   (b) a Ketose
    (c) a disaccharide   (d) a polysaccharide