TRIBHUVANUNIVERSITY
INSTITUTE OF ENGINEERING

KANTIPUR ENGINEERING COLLEGE

Model Questions for B.E. Entrance Test (2073)

Set: II (B) **Time: 2 hours** **Date: 2073/04/08**

Section: I Select the Best Alternative on the answer sheet given **60×1 = 60**

1. In an IC engine, the motion of piston is …… type.
(A) Oscillating (B) reciprocating (C) circular (D) all of above

2. In diesel engine, suction process consists of……
(A) fuel &air mixture (B) fuel only (C) air only (D) none

3. Water is first converted into steam in ……Engines .
(A) external combustion (B) two stroke petrol (C) four stroke diesel (D) internal combustion

4. In vertically placed traffic light signals, which color is on the top?
(A) yellow (B) black (C) green (D) red

5. The rounded aggregate is obtained from……..
(A) volcano (B) crusher (C) lake (D) river

6. In construction material, OPC is a type of…….
(A) brick (B) iron rod (C) sand (D) cement

7. No parking is a/an …….sign.
(A) regulatory (B) warning (C) information (D) none

8. Series circuit is….. divider circuit
(A) Voltage (B) Current (C) Charge (D) power

9. What type of energy is derived from heated groundwater?
(A) geothermal energy (B) solar energy (C) hydroelectric energy (D) nuclear energy

10. Transformer changes . . . . in electricity supply.
(A) only power (B) Power & resistance (C) voltage &curent (D) resistance

11. The total resistance …… in series connection.
(A) Remains same (B) less than half of minimum resistor
(C) Increases (D) decreases

12. The current gain of the common emitter transistor amplifier is ….
(A) zero (B) less than 1 (C) more than 1 (D) 1

13. FTP stands for ….
(A) file to protect (B) file transfer protocol (C) file trap protocol (D) none

14. The following is an out put device.
(A) keyboard (B) printer (C) mouse (D) pendrive

15. If A⊆ B then B'-A' equals
(A) A' (B) ϕ (C) B - A (D) B'

16. If xϵR then the value of x^2 - 6x + 13 will not be less than
(A) 6 (B) 4 (C) 7 (D) 8

17. The general values of x which satisfies sin x = - $\sqrt{(3/2)}$ and cos x = 1/2 are
(A) $2n\pi + (5\pi/3)$ (B) $2n\pi + (7\pi/6)$ (C) $2n\pi - (7\pi/6)$ (D) $2n\pi + (5\pi/4)$

18. If A is a square matrix of order 3 with |A| = 4 then |adj.A| is
(A) 8 (B) 12 (C) 16 (D) 20

19. $\lim_{x \to \infty} \frac{\sin x}{x}$ is

(A) 1 (B) -1 (C) ∞ (D) 0

20. If $y=1-\frac{x}{1!}+\frac{x^2}{2!}-\frac{x^3}{3!}+\frac{x^4}{4!}-.....\text{to}\ \infty$ then $\frac{d^2y}{dx^2}$ is

(A) y/2 (B) -y (C) 2y (D) y

21. $\int \frac{3\tan\frac{x}{3}-\tan^3\frac{x}{3}}{1-3\tan^2\frac{x}{3}}dx$ is

(A) – log cos x + c (B) – log sec x + c (C) log sin x + c (D) log tan x + c

22. If $\vec{a}.\vec{b} = |\vec{a}||\vec{b}|$ then the vectors $\vec{a}$ and $\vec{b}$ are

(A) perpendicular (B) coincident (C) parallel (D) null vectors

23. If the centroid of the triangle formed by the points (1, a), (2, b) and (c, -3) lies on the x-axis then

(A) a = 3 (B) a + b = 3 (C) a – b = 3 (D) b = 3

24. If k, – 2k, 3k denote the direction cosines of a line then the value of k is

(A) ± 14 (B) ± $\frac{1}{\sqrt{14}}$ (C) ± $\sqrt{14}$ (D) ± $\frac{1}{14}$

25. You spoke to him in <u>belligerent</u> tone. The synonym of 'belligerent' is:

(A) courageous (B) cowardy (C) effortless (D) hostile

26. All his neighbors are aware of his '<u>acrimonious</u>' nature. The antonym of 'acrimonious' is:

(A) informal (B) uncooperative (C) sympathetic (D) charitable

27. The word 'spontaneous' has its primary stress on its ……. syllable.

(A)second (B) first (C) third (D) fourth

28. Which of the following words contains the vowel sound /ʒ:/?

(A) cut (B) but (C) put (D) curd

29. A number of visitors ……. visited this place.

(A) has (B) have (C) was (D) are

30. Sita got her brother ……. her clothes.

(A) to wash (B) washed (C) washing (D) wash

31. My sister loves …….

(A) to sing. (B) to have sung. (C) singing. (D) to be singing.

32. Rosemary said to me, "Thank you". The reported speech form of this sentence is:

(A) Rosemary told me thank you. (B) Rosemary told me that thank you.
(C) Rosemary thanked me. (D) Rosemary wished thank you.

33. I saw Daffodil ……..

(A) danced (B) dance (C) dancing (D) to have danced

34. Do you want us ……. it right now?

(A) do (B) doing (C) done (D) to do

35. He has his breakfast at 5.30 a.m., …….?

(A) doesn't he (B) does he (C) hasn't he (D) has he

36. Two-third of the work …… accomplished.
(A) have been (B) has been (C) were (D) have

37. If I ……. you, I would decide instantly.
(A) am (B) was (C) had been (D) were

38. Which of the following is simple sentence?
(A) I saw a football match which was thrilling. (B) Waste not, want not.
(C) He worked hard to pass the examination. (D) Do as I tell you, or you will regret it.

39. Two pendulums oscillate with a constant phase difference of 90° and same amplitude. The maximum velocity of one v. The maximum velocity of the other will be
(A) v (B) 2v (C) $v\sqrt{2}$ (D) $\sqrt{2v}$

40. Which of the following is not the characteristic of displacement?
(A) it has both magnitude and direction (B) it is always positive
(C) it can be represented geometrically
(D) its magnitude is equal to the shortest distance between the initial and final positions of the particle

41. An electric fan is switched on in a closed room. The air in the room is
(A) cooled (B) heated or cooled depending on the atmospheric pressure
(C) maintains the same temperature (D) heated

42. What is the main cause of the shining of diamond?
(A) total internal reflection (B) refraction (C) reflection (D) dispersion of light

43. Huygens wave theory cannot explain
(A) diffraction (B) interference (C) photoelectric effect (D) polarization

44. A charged conductor has charge on its
(A) outer surface (B) inner surface (C) middle point (D) surrounding

45. Resistance of conductor is doubled keeping potential difference across it constant. The rate of generation of heat will
(A) be halved (B) become one-fourth (C) be doubled (D) becomes four times

46. The area enclosed by a hysteresis loop is a measure of
(A) retentivity (B) susceptibility (C) energy loss per cycle (D) permeability

47. The frequency of the fundamental note produced by closed organ pipe is f. If the diameter of the pipe is doubled, the frequency of the fundamental note produced by it will be
(A) 4f (B) f (C) 2f (D) 0.5f

48. Cathode rays enter a magnetic field making oblique angle with the lines of magnetic induction. What will be the nature of the path followed
(A) parabola (B) circle (C) helix (D) straight line

49. The value of azimuthal quantum number for the electrons present in 5s orbital is
(A) 1 (B) 0 (C) 2 (D) 5

50. An aqueous solution with pH = 0 is
(A) neutral (B) basic (C) amphoteric (D) acidic

51. No. of molecules present in 5 g of hydrogen is
(A) 1.505×10^{23} (B) 5×10^{24} (C) 1.505×10^{-21} (D) 1.505×10^{24}

52. Eq.wt. of $KMnO_4$ in acidic medium is
(A) M/1 (B) M / 5 (C) M / 4 (D) M /2 [M = Mol.wt.]

53. A lewis acid is
(A) Proton donor (B) Proton acceptor
(C) An electron pair acceptor (D) An electron pair donor

54. Bleaching action of chlorine is due to
(A) oxidation (B) reduction (C) complex formation (D) displacement

55. Which of the following has the highest energy?
(A) 4f (B) 6s (C) 5p (D) 4d

56. Which of the salts will produce an alkaline solution when dissolved in water?
(A) NH_4Cl (B) Na_2CO_3 (C) $NaNO_3$ (D) NaC

57. Blister copper is
(A) pure copper (B) alloy of copper
(C) copper containing impurities and dissolved SO_2 (D) ore of copper

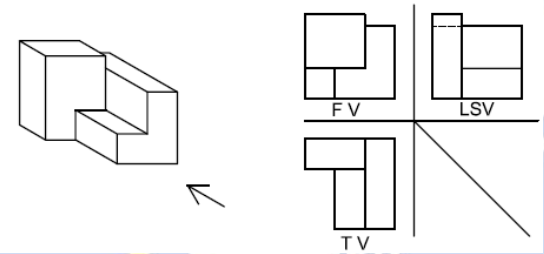
58. A Bessemer converter is used in the manufacture of
(A) silver (B)cast iron (C) pig iron (D) steel

59. Isobutane and n-butane are
(A) position isomers (B) chain isomers (C) tautomers (D) metamers

60. Acetylene on ozonolysis
(A) ethanal (B) ethanediol (C) methanal (D) ethanedial

Section: II Select the Best Alternative on the answer sheet given **40×2 = 80**

61. In the given orthographic projection what is wrong in the front view? (FM 2)



(A) A horizontal solid line (B) A horizontal hidden (dash) line
(C) A vertical solid line (D) A vertical hidden (dash) line

62. In first angle orthographic projection the position of top view is always on the …… of the front view. (FM 2)
(A) left side (B) Right side (C) bottom (D) top

63. The domain and range of the function $f(x) = \frac{1}{3 - \cos 2x}$ are
(A) R, [–1, 1] (B) R, R–{–1, 1} (C) R, [1/4, 1/2] (D) R, [–1/2, 1/2]

64. In ΔABC, if a = 2c and b = 3c then cos B is
(A) –1 (B) 1/2 (C) 1/3 (D) 1

65. If a polygon has the same number of sides as the diagonals then the number of sides is
(A) 3 (B) 5 (C) 4 (D) 6

66. The fourth, seventh and tenth terms of G.P are p, q, r respectively, then
(A) $p^2 = q^2 + r^2$ (B) $p^2 + q^2 + r^2 = 1$ (C) $r^2 = p + q$ (D) $q^2 = pr$

67. If $z = x + iy = (k + 3) + i\sqrt{5 - k^2}$ then the locus of z is
(A) a circle (B) a straight line (C) a parabola (D) an ellipse

68. The coefficient of x^3 in the expansion of log $(1 - 5x + 6x^2)$ is
(A) –35/3 (B) 1/2 (C) –1/8 (D) –17/3

69. $\vec{a} = 3\vec{\imath} - 5\vec{\jmath}$ and $\vec{b} = 6\vec{\imath} + 3\vec{\jmath}$ are two vectors and $\vec{c}$ is a vector such that $\vec{c} = \vec{a} \times \vec{b}$ then $|\vec{a}|:|\vec{b}|:|\vec{c}|$ is
(A) $\sqrt{34} : \sqrt{45} : \sqrt{39}$ (B) 34:39:45 (C) $\sqrt{34} : \sqrt{45} :39$ (D) 39:35:34

70. If coordinate axes are the angle bisectors of the pair of lines $ax^2 + 2hxy + by^2 = 0$ then
(A) A = b (B) $a^2 + b = 0$ (C) h = 0 (D) $a + b^2 = 0$

71. The centre of a circle is (2,-3) and the circumference is 10π. Then the equation of the circle is
(A) $x^2 + y^2 + 4x + 6y + 12 = 0$ (B) $x^2 + y^2 – 4x + 6y + 12 = 0$
(C) $x^2 + y^2 – 4x – 6y – 12 = 0$ (D) $x^2 + y^2 – 4x + 6y – 12 = 0$

72. The line $lx + my + n = 0$ will touch the parabola $y^2 = 4ax$ if
(A) $mn = al^2$ (B) $lm = an^2$ (C) mn = al (D) $ln = am^2$

73. If P be the point (2, 6, 3) then the equation of the plane through P at right angles to OP, O being the origin, is
(A) 2x + 6y + 3z = 7 (B) 2x + 6y + 3z = 49 (C) 2x + 6y – 3z = 49 (D) 2x – 6y + 3z = 7

74. If $y = \sin x – \cos x$ then $\frac{d^{17}y}{dx^{17}}$ is
(A) sin x – cos x (B) cos x + sin x (C) – sin x – cos x (D) sin x – cos x

75. The function $f(x) = x^x$ has a stationary point at
(A) x = e (B) $x = \sqrt{e}$ (C) x = 1 (D) x = 1/e

76. $\int_0^{\frac{\pi}{2}} \frac{(\sin x + \cos x)^2}{\sqrt{1+\sin 2x}} dx$ is
(A) 0 (B) 1/2 (C) 1 (D) 2

77. The area of the region bounded by the curves $y = x^2$ and y = |x| lying in first quadrant is
(A) 1/3 sq. units (B) 1/6 sq. units (C) 5/6 Sq. units (D) 5/3 sq. units

Read the passage and answer the questions from 78 to 81.

Cave men roaming on earth thought that the moon changes its shape by seeing its different shapes in the sky. Sometimes, it is seen as a thin white curve, sometimes half circle, and sometimes as a full orange disc. How must have our ancestors explained this fascinating behavior?
But now, we are confident why our satellite changes its shape. The moon revolves round the earth once in a month regularly and we only see a part of it. What that we see is that section of moon which catches the sun's light.

78. Our satellite means the ……..
(A) earth (B) sun (C) moon (D) satellite

79. The moon's fascinating behavior implies that ……..
(A) revolving around (B) seeing of different shapes
(C) it catches light (D) half circle

80. To our eyes at the earth, the moon changes in …….
(A) both color and shape (B) shape only (C) color only (D) circle

81. The reason of changing shape that we know is ……..
(A) fascinating behavior (B) the portion catching the sunlight
(C) revolving around the earth (D) our inability to see the moon during day

82. If two vectors re equal and their resultant is also equal to one of them, then the angle between two vectors is

(A) 60° (B) 90° (C) 120° (D) 0°

83. A particle is projected vertically upward and it reaches the maximum height H in time T seconds. The height of the particle at any time t will be

(A) $g(t-T)^2$ (B) $H - g(t-T)$ (C) $\frac{1}{2}g(t-T)^2$ (D) $H - \frac{1}{2}g(T-t)^2$

84. How much work must be done by a force on 100kg body in order to accelerate it from 0 to 20m/s in 10 second?

(A) 2×10^3 J (B) 2×10^4 J (C) 4×10^3 J (D) 4×10^4 J

85. A ring starts from rest and acquires an angular speed of 10 rad/s in 2 second. The mass of the ring is 500gm and its radius is 20cm. The torque on the ring is

(A) 0.02 Nm (B) 0.20 Nm (C) 0.01 Nm (D) 0.10Nm

86. Two rain drops of same radius coalesce. Before doing so, each was moving with terminal velocity v. what is the terminal velocity of the single drop so formed?

(A) $2^{2/3}$ v (B) 2 v (C) v / 3 (D) v / 2

87. A difference of temperature of 25°C is equivalent to a difference of

(A) 32°F (B) 72°F (C) 45°F (D) 25°F

88. The pressure (P) of an ideal gas and its mean kinetic energy (E) per unit volume are related

(A) P = E/2 (B) P = E (C) P = 2E/3 (D) P = 3E/2

89. Two waves of equal frequencies have their amplitude in the ratio 3:5. They superimpose on each other. The ratio of maximum to minimum intensities of the resultant wave is

(A) 16:1 (B) 3:5 (C) 9:25 (D) $\sqrt{3}:\sqrt{5}$

90. A ray of the light enters from a denser medium into rarer medium. The speed of light in rarer medium is twice than in denser medium. What is the critical angle for total internal reflection to take place

(A) 45° (B) 30° (C)60° (D) 75°

91. A person cannot see the objects clearly placed at a distance more than 40cm. He is advised to use lens of power

(A) +1.5 D (B) +2.5 D (C) -6.25 D (D) - 2.5 D

92. If the total magnetic field due to earth is $28Am^{-1}$, then the total magnetic induction due to earth is

(A) 0.352 gauss (B) 28 gauss (C) 28T (D) 0.352 T

93. F_G and F_E represent gravitational and electrostatic force respectively between electrons situated at a distance of 10 cm, the ratio of F_G / F_E is of the order of

(A) 10^{-42} (B) 10 (C) 1 (D) 10^{42}

94. A coil of the area $100cm^2$ has 500turns. Magnetic field of $0.1Weber/m^2$ is perpendicular to the coil. The field is reduced to zero in 0.1s. The induced e.m.f. in the coil is

(A) 1V (B) 50V (C) 5V (D) zero

95. The energy required to reduced remove an electron in a hydrogen atom from n = 10 state is

(A) 13.6eV (B) 1.36eV (C) 0.136eV (D) 0.0136eV

96. The binding energy of deuteron is 2.2MeV and of that of $_2He^4$ is 28 MeV, then the energy released is

(A) 30.2MeV (B) 25.8MeV (C) 19.2MeV (D) 23.6MeV

97. What current strength in amperes will be required to liberate 10 g of iodine from potassium iodide solution in one hour?

(A) 2.5 ampere (B) 4 ampere (C) 3.5 ampere (D) 2.11 ampere

98. 250 ml of 0.4M H_2SO_4 is mixed with 600ml of 0.25M KOH. The normality of the resulting solution is
(A) 0.0625N (B) 0.0588N (C) 0.625N (D) 0.12N

99. The gas formed by heating ethanol with conc. H_2SO_4 on passing into alkaline solution of $KMnO_4$ gives
(A) ethyl alcohol (B) ethylene glycol (C) acetic acid (D) acetaldehyde

100. The gas formed by heating ammonium chloride and slaked lime on reaction with Nesseler's reagent forms
(A) brown ppt. (B) yellow ppt. (C) black ppt. (D) reddish brown ppt.

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