TRIBHUVANUNIVERSITY
INSTITUTE OF ENGINEERING

KANTIPUR ENGINEERING COLLEGE

Model Questions for B.E. Entrance Test (2074)

Set: 3 (B) **Time: 2 hours** **Date: 2074/03/10**

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

1. Which of the following controls air fuel ratio in petrol engine?
(A) injector (B) cylinder (C) choke (D) carburetor

2. Biogas is mainly used as……
(A) lighting purpose (B) heating purpose (C) automobiles (D) none

3. Which of the following is the smallest power plant?
(A) Marsyangdi (B)Kulekhani (C) Trisuli (D) Kaligandak

4. The dis-continuous white line in between lanes indicate….the lane.
(A) may cross (B) don't turn (C) do-not cross (D) all of the above

5. A natural material of construction obtained from rocks by any suitable method is called……
(A) stone (B) brick (C) timber (D) iron

6. Refractory bricks resist …….
(A) chemical action (B) higher temperature (C) dampness (D)lower temperature

7. Wattmeter measures……
(A) active power (B) effective power (C) both a and b (D) apparent power

8. The Upper Tamakoshi 456 MW (under-construction) Power Plant is in….. district.
(A) Makwanpur (B) Sindhupalchowk (C) Ramechhap (D) Dolakha

9. MAN stands for
(A) metropolitan answer network (B) metropolitan area network
(C) medium area network (D) middle area network

10. Which of the following contains highest memory?
(A) Tera bit (B) Giga byte (C) kilo byte (D) mega byte

11. FTTP represents ……..
(A) protocal (B) Hyper text (C) Unix (D) LiNc

12. Zener diode is connected with load in……
(A) series (B) depends upon situation (C) parallel (D)all of the above

13. Which of the following is sequential device?
(A) pen drive (B)mouse (C) magnetic tape (D) printer The OR gate

14. The thickness of a 50 Hz transformer lamination is ……
(A) 0.35 mm (B) 0.35 cm (C) 0.33 m (D) 0.30cm

15. If $A \subseteq B$, $\overline{B} - \overline{A}$ is
(A) $\overline{A}$ (B) φ (C) A – B (D) $\overline{B}$

16. The general solution of $2\cos^2 x + \sin x\cos x - \sin^2 x = 0$ is
(A) $n\pi + \frac{\pi}{4}$ (B) $2n\pi \pm \frac{\pi}{4}$ (C) $n\pi + \frac{\pi}{6}$ (D) $n\pi - \frac{\pi}{4}$

17. The value of 'a' for which the vectors $3\vec{i} + 4a\vec{j} + \vec{k}$ *and* $-2\vec{i} + \vec{j} + 5\vec{k}$ are orthogonal is
(A) $\frac{-11}{4}$ (B) $\frac{7}{13}$ (C) $\frac{-2}{7}$ (D) $\frac{-3}{2}$

18. The equation of the straight line passing through the intersection of $3x - y + 2 = 0$ and $5x - 2y + 7 = 0$ and having infinite slope is

(A) $x = 3$ (B) $x + y = 3$ (C) $x = 1$ (D) $x = 4$

19. The projection of a line on axes are 6, 2, 3 then length of line is

(A) 1 (B) 3 (C) 7 (D) 5

20. If A. adjA= $\begin{pmatrix} 10 & 0 \\ 0 & 10 \end{pmatrix}$, then |A| equals

(A) 0 (B) 100 (C) 10 (D) 2×10

21. The value of k for which the one root of the equation $3x^2 + 7x + 6-k = 0$ is equal to zero is

(A) 3 (B) 5 (C) 2 (D) 6

22. $\lim_{x \to \infty} x \tan \frac{1}{x}$ is

(A) - 1 (B) ∞ (C) 0 (D) 1

23. The differential coefficient of sinx with respect to cosx is

(A) 2 tan x (B) – cotx (C) 2 cot x. cosecx (D) cos x. sinx

24. The value of $\int_{-\pi}^{\pi} \sin^3 x \cos^2 x \, dx$ is

(A) $\frac{\pi^4}{2}$ (B) $\frac{\pi^4}{4}$ (C) 1 (D) 0

25. The pair ……. has the same pronunciation.

(A) hate, hat (B) beat, bit (C) lead, lid (D) gait, gate

26. Which of the following words has its primary stress on the second syllable?

(A) private (B) priority (C) privilege (D) principle

27. No one wants to <u>jeopardize</u> his career. The synonyms of the underlined word is …….

(A) unbalance (B) wear away (C) endanger (D) belittle

28. It is not possible to ……. the suffering.

(A) mitigate (B) propitiate (C) instigate (D) masticate

29. The boy said to his sister, "Don't try to be funny!" The indirect speech of this sentence is

(A) The boy said to his sister not to try to be funny.

(B) The boy told his sister not try to be funny. (C) The boy told his sister to try to be funny.

(D) The boy told his sister not to try to be funny.

30. Which of the following is acceptable?

(A) If I saw him, I will call him. (B) If I saw him, I called him.

(C) If I see him, I would call him. (D) If I saw him, I would call him.

31. Which one of the following is correct?

(A) Neither Hari nor his brother have a book.

(B) Neither Hari nor his brother have had a book.

(C) Neither Hari nor his brother have read the book.

(D) Neither Hari nor his brother has a book.

32. Which of the following is not acceptable?

(A) sleep off (B) get off (C) put off (D) see off

33. I am really tired, ……?

(A) aren't I (B) am not I (C) am I not (D) amn't I

34. A state in which all religions are equal is called ……..

(A) secular (B) democratic (C) kingdom (D) religious

35. The president presided ……. the meeting.
(A) at (B) in (C) over (D) at

36. Which of the following is incorrect?
(A) They told me not to speak loudly. (B) She congratulated him.
(C) He asked me where I was going? (D) Ram wished me good morning.

37. Neither of the boys had ……. homework checked.
(A) their (B) her (C) his (D) hers

38. They ……. that they had already finished their meal.
(A) says (B) said (C) had said (D) has said

39. If a current is passed in a spring, it
(A) gets expanded (B) gets compressed (C) oscillates (D) remains same

40. If an electron has an initial velocity is perpendicular to the direction of electric field, the path of the electron is
(A) a straight line (B) a parabola (C) a circle (D) an ellipse

41. The sensitivity of moving coil galvanometer can be increased by decreasing
(A) the magnetic field (B) The couple per unit twist of suspension
(C) the area of the coil (D) the number of turns in the coil

42. The motion of projectile is represented by $y = R \sin(\omega t+\phi)$. The motion is
(A) oscillatory with SHM (B) uniform circular motion
(C) oscillatory but not SHM (D) neither oscillatory nor SHM

43. The dimension of impulse is
(A) $[M^0L^3T^{-1}]$ (B) $[ML^2T]$ (C) $[MLT^{-1}]$ (D) $[M^{-1}LT^{-1}]$

44. A particle is orbiting in vertical plane, its momentum will be
(A) directed horizontally (B) directed vertically
(C) at 60° to the vertical (D) tangential to the orbit

45. Absolute temperature of the gas is determined by
(A) the number of molecules in the gas (B) the speed of the gas
(C) the momentum of the molecules (D) the r.m.s. velocity of the molecules

46. A musical scale is constructed by providing intermediate frequencies between a note and its octave which
(A) bear a simple ratio with their neighbors (B) form a harmonic progression
(C) form an arithmetic progression (D) form a geometric progression

47. In young's double slit experiment, the separation between the slits is halved and the distance between the slits and screen is doubled. The fringe width is
(A) unchanged (B) halved (C) quadrupled (D) doubled

48. A ray of light travelling in a transparent medium falls on a surface separating the medium from air at an angle of incidence 45°. The rays undergoes total internal reflection. If n is the refractive index of the medium with respect to air, the possible value of n is
(A) 1.3 (B) 1.6 (C) 1.4 (D) 1.8

49. The quantum number values of the designation 3d are
(A) n = 3, l = 0 (B) n = 3, l = 2 (C) n = 3, l = 1 (D) n = 3, l = 3

50. Mass of 0.1 mole of CH_4 is
(A) 1 g (B) 16 g (C) 0.6 g (D) 1.6 g

51. pH of 0.0001 M HCl is
(A) 6 (B) 2 (C) 4 (D) 7

52. If three electrons are lost by a metal ion M^{3+}, its final oxidation number would be
(A) +6 (B) + 4 (C) + 5 (D) 0

53. Lithium shows the diagonal relationship with
(A) Na (B) Al (C) Si (D) Mg

54. If red hot steel rod is suddenly immersed in water, the steel becomes
(A) soft and malleable (B) hard and brittle (C) tough and ductile (D) fibrous

55. The bond angle of H-N-H in ammonia molecule and structure are
(A) 107.8 ^{o} , Pyramidal (B) 90 ^{o}, Tetrahedral
(C) 120 ^{o},Triogonal bipyramidal (D) 109 ^{o} 28', Trigonal

56. Oxidation number of chlorine in ClO_3^- is
(A) 4 (B) 6 (C) 5 (D) 7

57. The waste material in an ore is called
(A) flux (B) matte (C) gangue (D) mineral

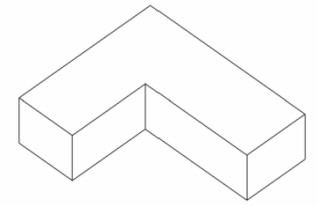
58. Nitrates of all metals are
(A) unstable (B) soluble in water (C) coloured (D) insoluble in water

59. Nitration of benzene is
(A) nucleophilic addition (B) nucleophilic substitution
(C) electrophilic addition (D) electrophilic substitution

60. Isopentane and neopentane are
(A) chain isomers (B) metamers (C) position isomers (D) tautomers

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

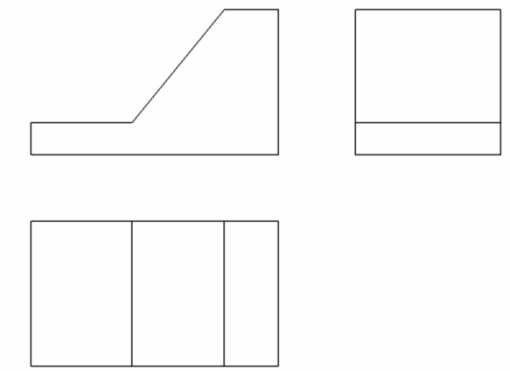
61. What is the wrong in front view of the given figure?

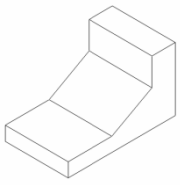


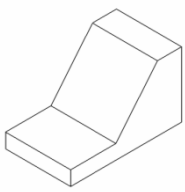
Front view

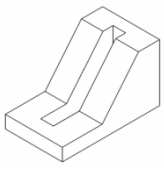
(A) vertical hidden line (B) vertical solid line
(C) horizontal solid line (D) horizontal hidden line

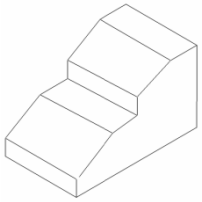
62. Select the correct Isometric view of the solid for the given orthographic views.



(A) 

(B) 

(C) 

(D) 

63. The domain and range of $\sqrt{4-x^2}$ are

(A) R, [0,2] (B) [0, 2], [0, 2] (C) [-2, 2], [0,2] (D) [0,2], [0,4]

64. In ΔABC, if a = 4,b= 3 and A = 60^0 , then C is the root of the equation

(A) $x^2 - 3x - 7 = 0$ (B) $x^2 + 3x + 7 = 0$ (C) $x^2 - 3x + 7 = 0$ (D) $x^2 + 3x - 7 = 0$

65. Let $\vec{a}$, $\vec{b}$, $\vec{c}$ be the three vectors such that $\vec{a}.(\vec{b}+\vec{c}) = \vec{b}.(\vec{c}+\vec{a}) = c.(\vec{a}+\vec{b}) = 0$ *and* $|\vec{a}|=1, |\vec{b}|=4, |\vec{c}|=8$, *then* $|\vec{a}+\vec{b}+\vec{c}|$ is

(A) 13 (B) 9 (C) 81 (D) 5

66. Slope of the lines represented by $x^2 + hxy + 2y^2$ are such that one is double of other, then h equals

(A) $\pm\sqrt{2}$ (B) $\pm\sqrt{3}$ (C) $\frac{1}{\sqrt{3}}$ (D) ± 3

67. A circle touches the x-axis and cuts off a constant length 2*l* from y – axis, then the locus of its center is

(A) $y^2 = x^2 + l^2$ (B) $x^2 + y^2 = l^2$ (C) $y^2 = 2x^2 - l^2$ (D) $y^2 = x^2 + \frac{l^2}{2}$

68. The equation of the directrix of the parabola $5y^2 = 4x$ is

(A) 4 x - 1 = 0 (B) 4x + 1 = 0 (C) 5x + 1 = 0 (D) 5x – 1 = 0

69. A plane π makes intercepts 4 and 3 respectively on x-axis and z-axis. If it is parallel to y-axis, then its equation is

(A) 3x + 4z = 12 (B) 3z + 4x = 12 (C) 3y + 4z = 12 (D) 3z + 4y = 12

70. If the 3rd term of G.P is 4, then the product of first 5 terms is

(A) 4^5 (B) 4^4 (C) 5^4 (D) 4^3

71. The value of $\frac{(-1+\sqrt{3}i)^{3n}}{2} + \left(\frac{-1-\sqrt{3}i}{2}\right)^{3n}$ is

(A) 3 (B) 1 (C) 2 (D) 0

72. The number of ways in which we can select three numbers from 1 to 30 so as to exclude every selection of three consecutive number is

(A) 2163 (B) 4032 (C) 2040 (D) 4010

73. The value of $\log_e(1 + x + x^2 + x^3 + \ldots\ldots)$ is equal to

(A) $\frac{x}{1!}-\frac{x^2}{2!}+\frac{x^3}{3!}-\frac{x^4}{4!}+\ldots\ldots\ldots\ldots$ (B) $x-\frac{x^2}{2}+\frac{x^3}{3}-\frac{x^4}{4}+\ldots\ldots\ldots\ldots$

(C) $\frac{x}{1}+\frac{x^2}{2}+\frac{x^3}{3}\frac{x^4}{4}+\ldots\ldots\ldots\ldots\ldots$ (D) $\frac{x}{1!}+\frac{x^2}{2!}+\frac{x^3}{3!}+\frac{x^4}{4!}+\ldots\ldots\ldots\ldots$

74. If $y=\frac{x}{1}+\frac{x^2}{2}+\frac{x^3}{3}+\ldots\ldots\ldots\ldots$, then $\frac{dy}{dx}$ is

(A) 0 (B) $\frac{1}{1-x}$ (C) e^x (D) $\log_e(1-x)$

75. $\int_0^{\frac{\pi}{2}} \frac{\sin x}{\sin x+\cos x}\,dx$ is

(A) π (B) $\frac{\pi}{2}$ (C) $\frac{\pi}{6}$ (D) $\frac{\pi}{4}$

76. The rate of change of volume of the sphere with respect to its surface area when the radius is 2 cm is

(A) 4 (B) 2 (C) 3 (D) 1

77. The area between $y^2 = 4ax$ and its latus rectum is

(A) $4a^2$ (B) $\frac{8}{3}a$ (C) $\frac{4}{3}a^2$ (D) $\frac{8}{3}a^2$

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

Experiments with the sulphonamides have made clear a fact about germs which is gaining increasing importance in fighting them. Germs, it seems, have the same ability as all the other living things gradually to change themselves to suit new conditions. But, as the generation of germs lasts only twenty-five or thirty minutes, before all the germs divide to form new ones, changes that would take many years in animals can be achieved by germs in a few hours. Perhaps, then, you give the attacking germ a dose of sulphonamides which upsets them somewhat but is not strong enough to prevent them from multiplying; if so, they very rapidly develop new powers which enable them to resist the effects of the drug. After this has happened, even the strongest dose will fail to disturb them.

78. Like all living things, germs can change themselves to suit new conditions. This adjustment is possible because the germs have ……..

(A) the power of adaptability (B) the power of compliance
(C) the power of adoptability (D) the power of fluctuation

79. Since germs can change themselves to suit new conditions, the task of fighting them has become ……..

(A) absolutely impossible (B) much easier
(C) much more difficult (D) increasingly important

80. Germs which are not disturbed even by the strongest possible dose of the sulphonamides are said to have become ……..

(A) immortal (B) immune (C) improvised (D) immobile

81. One generation of germs expires, bringing into existence the next generation ……..

(A) in twenty minutes (B) in not more than half an hour
(C) in twenty-five minutes (D) in a few hours

82. Given that $F = at + bt^2$, where F denotes force, t time, then dimensions of a and b are

(A) LT^{-2} and T^{-2} (B) T and T^{-2} (C) LT^{-1} and T^{-2} (D) MLT^{-3} and MLT^{-4}

83. The equation of motion of a projectile is $y = 12x - \frac{3}{4}x^2$. The range of projectile is

(A) 36 m (B) 21 m (C) 16 m (D) 48 m

84. If the momentum of a body is increased by 50% then the percentage increases in its kinetic energy

(A) 125% (B) 100% (C) 25% (D) 200%

85. A stone is dropped into a lake from a tower of 500 m height. The sound of the splash will be heard by man often.

(A) 11.5 sec (B) 14 sec (C) 4 sec (D) 19.5 sec

86. A steel tape measure is accurate at 20^0C. It is used at 10^0C to measure a distance of 1 km. The reading of tape will be (α for steel = 12×10^{-60} °C^{-1})

(A) 0.99988 km (B) 1 km (C) 1.00024 km (D) 1.00012 km

87. If room temperature is found to be equal to dew point, then relative humidity is

(A) 10% (B) 100% (C) 75% (D) 50%

88. The electric potential as a function of distance is given by $v = 5x^2 + 10x - 9$ volt. The electric field at x = 1 m will be

(A) 11 v/m (B) 6 v/m (C) – 20 v/m (D) – 23 v/m

89. A 4μF capacitor is charged to 400 V and then its plates are joined through a resistance of 1kΩ. The heat produced in the resistor is

(A) 0.16 J (B) 1. 28 J (C) 0.64 J (D) 0.32 J

90. A wire has a resistance 10 Ω. It is stretched by one-tenth of its original length then its resistance will be
(A) 10 Ω (B) 11 Ω (C) 9 Ω (D) 12Ω

91. A straight wire of length 0.5 m and carrying a current of 1.2 A is placed in a uniform magnetic field of induction 2 T. The magnetic field is perpendicular to the length of the wire. The force on the wire is
(A) 2.4 N (B) 1.2 N (C) 1.2 N (D) 2 N

92. A step up transformer operates on a 230 V line and supplied a current of 2 A. The ratio of primary and secondary windings is 1:25. The primary current is
(A) 12.5 A (B) 50 A (C) 8 A (D) 25 A

93. An air bubble in glass slab(μ=1.5) from one side is 6 cm and from other side in 4 cm. The thickness of slab is
(A) 10 cm (B) 15 cm (C) 12 cm (D) 18 m

94. The intensity ratio at a point of observation due to two coherent waves is 100:1. The ratio between their amplitudes is
(A) 10:1 (B) 1:10 (C) 1:100 (D) 1:1

95. If a sample o 16 gm radioactive substance disintegrate to 1 gm in 120 days, then what will be the half-life of the sample?
(A) 15 days (B) 7.5 days (C) 30 days (D) 60 days

96. The energy required to remove an electron in hydrogen atom from n = 10 slate is
(A) 0.136 eV (B) 1.36 eV (C) 13.6 eV (D) 0.0136eV

97. The normality of a solution containing 32.5 g of $(COOH)_2.2H_2O$ per 0.5 L is
(A) 0.1 N (B) 10 N (C) 2N (D) 1 N

98. An electric current is passed through three cells in series containing respectively solution of copper sulphate, silver nitrate and potassium iodide. What weight of iodine will be liberated while 1.25 g of copper being deposited?
(A) 15 g (B) 5 g (C) 6 g (D) 7 g

99. The gas formed by hydrolysis of aluminium carbide when passed into steam can form
(A) producer gas (B) laughing gas (C) water gas (D) marsh gas

100. IUPAC name of isohexane is
(A) 2-methyl pentane (B) 2-methyl hexane
(C) 3-methyl pentane (D) 4-methyl pentane

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