RAJASTHAN P.E.T.
CHEMISTRY – 1997

1. The hybridization state of C atom in butendioic acid is :
(1) sp^2 (2) sp^3 (3) both two (4) sp

2. **Which of the following is not a isomer of pentane** :
(1) n-pentane
(2) 2, 2-dimethy 1 propane
(3) 2, 3-dimethy 1 butane
(4) 2-methy 1 butane

3. The oxidation number of C atom in Ch_2CI_2 and CCI_4 are respectively :
(1) -2 and – 4 (2) 0 and – 4 (3) 0 and 4 (4) 2 and 4

4. Which of the following dissolves in lonic solvents :
(1) C_6H_5 (2) CH_3OH (3) CCI_4 (4) C_5H_{12}

5. The conjugate acid of HS is :
(1) S^{-2} (2) H_2S_2 (3) both two (4) none

6. Phenolphthalein of pH range [8-10] is used in which of the following type of titration as a suitable indicator :
(1) NH_4OH and HCI
(2) NH_4OH and HCOOH
(3) NH_4OH and $C_2H_4O_2$
(4) NaOH and $C_2O_4H_2$

7. Which of the following is iron are :
(1) Malachite (2) Hernatite (3) Siderite (4) Limonite

8. The molar concentration of chloride ions in the resulting solution of 300 ml.of 3.0 M NaCI and 200 ml. of 4.0 M $BaCl_2$ will be :
(1) 1.7 M (2) 1.8 M (3) 5.0 M (4) 3.5 M

9. Which of the following has least bond energy :
(1) N_2^{-2} (2) N_2^- (3) N_2^+ (4) N_2

10. Which of the following species has highest bond energy :
(1) O_2^{-2} (2) O_2^+ (3) O_2^- (4) O_2

11. Which of the following compound is not aromatic :
(1) 1, 3-cyclobutene
(2) pyridine
(3) furane
(4) thiophene

12. Which of the following compound is used as refrigerant :

(1) CCI_2F_2
(2) CCI_4
(3) CF_4
(4) Acetone

13. Which of the following is weak acid :

(1) C_6H_6 (2) $CH_3\text{-}C{\equiv}CH$ (3) $CH_2{=}CH_2$ (4) $CH_3\text{-}C{\equiv}C\text{-}CH_3$

14. L.P.G. mainly consist of the following :

(1) Methane (2) Hydrogen (3) Acetylene (4) Butane

15. The solubility product of $CaCo_3$ is 5 x 10^{-9}. The solubility will be :

(1) 2.5 x 10^{-5} (2) 7 x 10^{-5} (3) 2.5 x 10^{-4} (4) 2.2 x 10^{-9}

16. The outer electronic configuration of alkali earth metals is :

(1) nd^{10} (2) ns^1 (3) np^6 (4) ns_2

17. The nature of 2, 4, 6-trinitrophenol is :

(1) Neutral (2) Basic (3) Acidic (4) Weak basic

18. Which of the following group is sharp ortho and para directive :

(1) $–C_6H_5$ (2)-OH (3) $–CH_3$ (4) –CI

19. By which of the following process hydrocarbons are found from petroleum :

(1) combustion
(2) fractional distillation
(3) addition
(4) all above

20. A sample of petroleum contains 30% n-heptane, 10% 2-methyl hexane and 60% 2, 2, 4-trimethyl pentane, the octane no. of this sample will be :

(1) 30% (2) 60% (3) 10% (4) 70%

21. In which of the following halogens p-electrons does not take part in resonance :

(1) $CH_2{=}CH\text{-}CH_2Cl$ (2) BrC_6H_5
(3) C_6H_5Cl (4) $CH_2{=}CHCl$

22. Which of the following statement is false :

(1) 40% solution HCHO is known as formalin
(2) HCHO is least reactive in its homologous series
(3) The B.P. of isovarelaldehyde is less than n-varelaldehyde
(4) The boiling point of ketones are higher than that of aldehydes

23. If n + ιι= 8 then the expected no. of orbitals will be :

(1) 4 (2) 9 (3) 16 (4) 25

24. $A \xrightarrow{\text{Alc. KOH}} B \xrightarrow{2Cl_2} C \xrightarrow{Ca(OH)_2}$ **here the compound C will be :**
(1) Lewsite (2) Westron (3) Acetylene tetra chloride (4) Both 2 and 3

25. Which of the following is least hydrolysed :
(1) $BeCl_2$ (2) $MgCl_2$ (3) $CaCl_2$ (3) $BaCl_2$

26. The laughing gas is :
(1) N_2O_4 (2) NO (3) N_2O (4) N_2O_5

27. The hydrogen ion concentration of a solution is 3.98 x 10^{-6} mole per liter. The pH value of this solution will be :
(1) 6.0 (2) 5.8 (3) 5.4 (4) 5.9

28. The reaction of sodium acetate and sodalime gives :
(1) Butane (2) Ethane (3) Methane (4) Propane

29. Which of the following acids does not contain – COOH group :
(1) Carbamic acid (2) Barbituric acid
(3) Lactic acid (4) succinnic acid

30. Which of the following compound of xenone does not exists :
(1) XeF_6 (2) XeF_4 (4) XeF_5 (4) XeF_2

31. $FeSO_4$, $7H_2O$ is :
(1) Mohr's salt (2) Blue vitriol (3) Green vitriol (4) White vitriol

32. The solution of BiCl3 in dil. HCI when diluted with water white precipitate is formed which is :
(1) Bismith oxychloride (2) Bismith oxide
(3) Bismith hydroxide (3) none of these

33. The strongest acid is :
(1) acetic acid
(2) trichloroacetic acid
(3) dichloracetic acid
(4) monochloroacetic acid

34. The false statement regarding alkane is :
(1) This does not perform polymerization reaction
(2) This does not gives elimination reaction
(3) It does not disappear the colour of dilute $KMnO_4$ solution
(4) It does not decolourise bromine water

35. Which of the following is strongest base :
(1) $C_6H_5NH_2$ (2) CH_3NH_2

(3) NH_3 (4) CH_3CONH_2

36. Which of the following aromatic compound gives sulphonation reaction very easily :

(1) Chlorobenzene (2) Nitrobenzene (3) Toluene (4) benzene

37. The geometry of I3- is :

(1) Triangular (2) Linear (3) Tetrahedral (4) T-shape

38. The half life of a radio active element is 140 days. 1 gm. of this element after 560 days will become :

(1) $\frac{1}{16}$ gm (2) $\frac{1}{4}$gm (3) $\frac{1}{8}$gm. (4) $\frac{1}{2}$ gm.

39. **The volume concentration of hydrogen peroxide 6.8% concentration will be** :

(1) 5 (2) 11.2 (3) 22.4 (4) 20

40. Which of the following on combustion give maximum energy :

(1) Ethane (2) Propane (3) Methane (4) Butane

41. C6H6 + CH3CI $\xrightarrow{\text{Anhy. AICI}_3}$ C6H5CH3 + HCI The name of above reaction is :

(1) Gattermann (2) Reimer-tiemann

(3) Friedel-Craft (4) Cannizaro

42. The oxidation state of Cr in $K_2Cr_2O_7$ is :

(1) + 4 (2) + 3 (3) + 6 (4) + 5

43. The natural rubber is the polymer of :

(1) 1, 3- butadiene (2) polyamide (3) isoprene (4) none of these

44. Nylone-66 is a :

(1) polyester (2) polyamide (3) polyacrylate (4) none of these

45. $2NO(g) + CI_2\ (g) \rightleftarrows 2\ NOCI$ The equilibrium constant for this reaction is :

(1) $K_c = \frac{[NOCI]^2}{[NO]^2[CI_2\}^2}$ (2) $K_c = \frac{[NOCI]^2}{[2NO]^2[CI_2]}$

(3) $K_c = \frac{[NOCI]^2}{[NO]^2\ [CI^2]}$ (4) $K_c = \frac{[2NOCI]}{[2NO][CI]}$

46. $C_6H_6 + CO + HCI \xrightarrow{A} C_6H_5CHO + HCI$ here A is :

(1) anhydrans ZnO (2) $V_2O_5/450^0$ C

(3) anhydrous $AICO_3$ (4) solid KOH

47. The values of for HCN and CH_3COOH are 7.2×10^{-10} and 1.75×10^{-5} (at 25^0 C) respectively. The strongest acid amongst them is :
(1) CH_3COOH(2) HCN (3) both (4) none of these

48. In which of the following carbon atom (asterisk) is asymmetric :
(1) $CH_3CH_2CH\ (CH_3)\ CH_2OH$
(2) $CH_3CH_2CH\ (CH_3)\ CHOH$
(3) $CH_3CH_2CH_2CH_2CH_2OH$
(4) $CH_3CH_2CH\ (CH_3)CH_2OH$

49. Benzene reacts with CH_3COCI in presence of Lewis acid $AICI_3$ to form :
(1) Acetophenone (2) Toluene (3) Benzyl Chloride (4) Chlorobenzene

50. Which of the following is reducing agent :
(1) H_2S (2) HNO_3 (3) H_2O (4) $K_2Cr_2O_7$

51. In which of the following alkyl chloride the possibility of SN_1 reaction mechanism is maximum :
(1) $(CH_3)_2CHCI$ (2) $(CH_3)_3C\text{-}CI$ (3) CH_3CI (4) CH_3CH_2CI

52. The energy produced realated to mass decay of 0.02 amu is :
(1) 28.2 MeV (2) 931 MeV (3) 18.62 MeV (4) none of these

53. The mole of hydrogen ion in 50 ml. of 0.1 M HCI solution will be :
(1) 5×10^2 (2) 5×10^{-3} (3) 5×10^3 (4) 5×10^{-2}

54. Petroleum is mainly consist of :
(1) Aliphatic alcohol
(2) Aromatic hydrocarbon
(3) Alipnetic hydrocarbon
(4) None of these

55. $C_6H_6OCH_3 + HI \xrightarrow{\Delta\Delta}$ …….. + ……….. The products in the above reaction will be :

(1) $C_6H_5I+CH_3OH$ (2) $C_6H_5CH_3+HOI$
(3) $C_6H_5OH+CH_3I$ (4) $C_6H_6+CH_3OI$

56 F3 is :
(1) Bronsted base (2) Lewis base (3) Lewis acid (4) Bronsted acid

57. Which of the following compound gives violet colour with $FeCI_3$ solution:
(1) Benzaldehyde (2) Aniline (3) Nitrobenzene (4) Phenol

58. Hypo solution forms which of the following complex compound with AgCI :
(1) $Na_5[Ag(S_2O_3)_3]$ (2) $Na_3[Ag(S_2O_3)_2]$

(3) $Na_2\{Ag(S_2O_3)_2]$ (4) $Na_3[Ag(S_2O_3)_3]$

59. Molecular oxygen is :
(1) ferro magnetic (2) diamagnetic (3) para magnetic (4) non magnetic

60. Bonds in acetylene are :
(1) 2π bonds (2) one π bond (3) 3π bonds (4) none of these

61. The false statement for Griynaed reagent is :
(1) It gives tertiary alcohol with acetamide
(2) It gives tertiary alcohol with acetone
(3) It gives secondary alcohol with acetaldehyde
(4) It gives primary alcohol with formaldehyde

62. Which of the following alkane exists is liquid state at normal temperature :
(1) $C_{20}H_{42}$ (2) C_3H_8 (3) C_8H_{18} (4) CH_4

63. The solubility of AgCI at 25^0 C will be maximum in :
(1) Potassium chloride solution
(2) $AgNO_3$ solution
(3) Water
(4) All above

64. The weight of a benzene molecule is :
(1) 78 gm. (2) 7.8 gm. (3) 13×10^{-23} (4) none of these

65. $CuFeS_2$ is :
(1) iorn pyrites (2) malachite (3) chalcosite (4) chalcopyrites

66. Primary halides follow the following reaction mechanism :
(1) SN_1 (2) SN_2 (3) both (4) none of these

67. C and Si belong to the same group of periodic table, CO_2 is a gas and SiO_2 is a :
(1) liquid (2) gas (3) solid (4) none of these

68. H_2S is a gas while H_2O is a liquid because :
(1) there is association due to hydrogen bonding
(2) bond energy of OH high
(3) the ionization potential of oxygen is high
(4) the electro negativity of oxygen is high

69. "The negative part of the molecule adding to the double bond goes to that unsaturated asymmetric carbon atom which is linked to the least number of hydrogen atoms." This statement is related to :
(1) Markownikoff's law
(2) Peroxide effect
(3) Bayer's law of distortion

(4) none of these

70. The conjugate base of NH3 is :

(1) N_2H_4 (2) NH_2^- (3) NH_4^+ (4) NH_2^+

71. (a) N_2 and (b) C_2H_2. The nos. of π and σ bond in the molecules are respectively :

(1) (a) 2,2 (b) 2,2 (2) (a) 1,2 (b) 2,1
(3) (a) 2,1 (b) 2,3 (4) (a) 2,1 (b) 2,1

72. In which of the following compound there are maximum no. of sp^2 hybrid C atoms:

(1) Benzene (2) 1,3,5-hexatriene
(2) 1,2,4-hexatriene (4) both 1 and 2

73. The shape of the molecule having hybrid orbitals of 20% character will be :

(1) octahedral (2) tetrahedral
(3) square planer (4) triangular bipyramidal

74. The pH of a solution is 5. If the dilution of this solution is increased by 100 times, the pH value will be :

(1) 5 (2) 7 (3) 9 (4) 8

75. The required amount of oxygen for combustion of 20 ml. of gaseous hydrocarbon is 50 ml. The hydrocarbon will be :

(1) C_2H_2 (2) C_2H_4 (3) C_2H_6 (4) C_3H_4

76. The formula of Celestine is :

(1) $SrSO_4$ (2) $SrCO_3$ (3) SrO (4) $SrCl_2$

77. $CuCl_2 + \rightarrow Cu + Cl_2$. The required amount of electricity for this reaction is :

(1) 4 faraday (2) 2 faraday (3) 1 faraday (4) 3 faraday

78. Nitrogen does not forms NF_5 because :

(1) The bondenergy of N≡N is very high
(2) Vaccent d-orbitals are not present
(3) N belongs to V group
(4) There is inert effect

79. The normal temperature when raised by 10^0 C, the rate of reaction will be :

(1) lowered by 2 times
(2) increased by 2 times
(3) lowered by 10 times
(4) increased by 10 times

80. Which of the following gives red precipitate with ammonical cuprous chloride :

(1) Propane (2) Ethane (3) Methane (4) Acetylene

81. $[Cu(NH_3)_4]^{2+}$ snows the following hybridization :

(1) dsp^2 (2) sp^3d (3) dsp^3 (4) sp^3

82. A solution contains CI-, I^- and S O_4^{3-} ions in it. Which of the following ion is capable to precipitate all of above when added in this solution :

(1) Pb^{2+} (2) Ba^{2+} (3) Hg^{2+} (4) Cu^{2+}

83. Fool's gold is :

(1) Cu_2S (2) FeS_2 (3) Al_2O_5 (4) $CuFeS_2$

84. In which of the following compound the central atom is in sp^2 hybrid state :

(1) OF_2 (2) $HgCl_2$ (3) XeF_2 (4) NH_2^+

85. The number of alkenyl groups possible from $C_4H_7^-$ are :

(1) 7 (2) 5 (3) 3 (4) 8

86. The tetraethyl lead mixed in petrol is works as :

(1) Cooling agent
(2) Anti knocking agent
(3) Bleaching agent
(4) None of these

87. The alkaline hydrolysis of ester is known as :

(1) dehydrogenation (2) dehydration (3) esterification (4) saponification

88. The degree of ionization of 0.4 M acetic acid will be : (K_a = 1.8 x 10^{-5})

(1) 6.71 x 10^{-3} (2) 1.6x10^{-3}
(3) 0.4x1.8x10^{-5} (4) 1.8x10^{-5}

89. Haber process is used for production of which of the following :

(1) NH_3 (2) HNO_3 (3) H_2SO_4 (4) O_3

90. The p_{ka} value of phenolphthalein is 9.1 and the pH range is 8-10. In which of the following titrations it can be used as an indicator :

(1) $NH_4OH$and HCI
(2) NH_4OH and CH_3COOH
(3) NaOH and HCI
(4) NH_4OH

91. Number of electrons in a one molecule of CO_2 :

(1) pb^{2+} (2) Hg^{2+} (3) Ba^{2+} (4) Cu^{2+}

92. Which of the following species shows the maximum magnetic moment :

(1) Mn^{+6} (2) Ni^{2+} (3) Fe^{3+} (4) Ag^+

93. K_{sp} value of CaF_2 is 3.75 x 10^{11} The solubility will be :

(1) 1.45×10^{-11} mol/litre^{-1}
(2) 3.45×10^{-4} mol/liter^{-1}
(3) 2.05×10^{-4} mol/liter^{-1}
(4) 3.75×10^{-11} mol/liter^{-1}

94. When Pb_3O_4 is heated with dilute H N O_3 it gives :
(1) pbO_2 and $pb(NO_3)_2$
(2) pbO and $pb(NO_3)_2$
(3) pbO_2
(4) pbO

95. C-H bond length is least in :
(1) Acetylene (2) Methane (3) Ethylene (4) Ethane

96. The minimum nos. of carbon atoms in ketones which will show chain isomerism will be :
(1) Seven (2) four (3) six (4) five

97. Which of the following organic compound could not be dried by anhydrous $CaCI_2$:
(1) ethanol (2) benzene (3) chloroform (4) ethyl acetate

98. Which of the following compound forms white precipitate with bromine water :
(1) Nitrobenzene (2) Phenol (3) Benzene (4) all above

99. Gypsum is :
(1) $CaSO_4.H_2O$ (2) $CaSO_4.\ 2H_2O$
(3) $2CaSO_4.\ 2H_2O$ (4) $CaSO_4$

100. Which of the following carbonium ion is most stable :

(1) $CH_3\text{-}\overset{+}{C}\text{—}CH_3$ (2) $CH_3\overset{+}{C}H_2$

(3) $CH_3 0\overset{+}{C}H\text{-}CH_3$ with CH_3 printed above (4) $\overset{+}{C}H_3$

ANSWER SHEET

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

RAJASTHAN P.E.T.
MATHS-1995

1. The equation of the normal to the circle x2 + y2 = a2 at point (x′ y′) will be :

(1) $x'y - xy' = 0$ (2) $xx' - yy' = 0$

(3) $x'y + xy' = 0$ (4) $xx' + yy' = 0$

2. Equation of the bisector of the acute angle between lines 3x + 4y + 5 = 0 and 12x – 5y – 7 = 0 is :

(1) $21x + 77y + 100 = 0$

(2) $99x - 27y + 30 = 0$

(3) $99x + 27y + 30 = 0$

(4) $21x - 77y - 100 = 0$

3. Equation to the line passing through the point (-4,5) and perpendicular to 3x = 4y = 7 :

(1) $3x-4y+32=0$ (2) $4x+3y+1= 0$

(3) $3x+4y-8=0$ (4) $4x-3y+31=0$

4. If θ is the angle between two straight lines represented by $ax^2 + 2hxy + by^2 = 0$ then :

(1) $\tan\theta = \dfrac{2\sqrt{h^2 + ab}}{a + b}$

(2) $\cos\theta = \dfrac{2\sqrt{h^2 - ab}}{a + b}$

(3) $\tan\theta = \dfrac{\sqrt{h^2 - ab}}{a + b}$

(4) $\tan\theta = \dfrac{2\sqrt{h^2 - ab}}{a + b}$

5. The real part of cos h (α + iβ):

(1) $\sin\alpha \sin h\beta$ (2) $\cos\alpha \cos h\beta$

(3) $2\cos n\theta$ (4) $\cos h\alpha \cos\beta$

6. If z = cos θ + i sin θ, then the value of $z^n + \dfrac{1}{z^n}$ will be :

(1) $\sin 2n\theta$ (2) $2\sin n\theta$ (3) $2\cos n\theta$ (4) $\cos 2n\theta$

7. If α and β are the roots of the equation $x^2 - 2x + 4 = 0$ then the value of $\alpha^n + \beta^n$ will be :

(1) $i2^{n+1}\sin(n\pi/3)$ (2) $2^{n+1}\cos(n\pi/3)$

(3) $i2^{n-1}\sin(n\pi/3)$ (4) $2^{n-1}\cos(n\pi/3)$

8. $[\sin(\alpha + \theta) - e^{ai}\sin\theta]^n$ is equal to :

(1) $\cos^n\alpha\, e^{in\theta}$ (2) $\sin^n\alpha\, e^{in\theta}$

(3) $\cos^n\alpha\, e^{-in\theta}$ (4) $\sin^n\alpha\, e^{-in\theta}$

9. If A is a skew symmetric matrix of second order and C is a column matrix of second order then CAC is equal to :

(1) [0] (2) [1] (3) $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$ (4) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

10. If A = $\begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$ and I = $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ then the correct statement is :

then the correct statement is :

(1) $A^2+5A-7I = 0$
(2) $-A^2+5A+7I = 0$
(3) $A^2-5A+7I = 0$
(4) $A^2+5A+7I = 0$

11. If A and B are the two matrices of the same order and A^2-b^2 = (A+B) (A-B) , then the correct statement will be :

(1) $A'B' = AB$ (2) AB=BA (3) $A^2+B^2 = A^2-B^2$ (4) none of these

12. The value of the determinant $\begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-a-b \end{vmatrix}$ will be :

(1) $(a-b-c)(a^2+b^2+c^2)$ (2) $(a+b+c)^3$ (3) (a+b+c)(ab+bc+ca) (4) none of these

13. If $(1 + x)^n = C_0 + C_1x + C_2x^2 + \ldots + C_nx^n$, then $C_0-C_1+C_2-C_3+\ldots+(-1)^n C_n$ is equal to:

(1) 3^n (2) 2^n (3) 1 (4) 0

14. The term independent of x in the expansion of $\left(x + \frac{1}{x}\right)^{2n}$ is :

(1) $\frac{1.3.5\ldots\ldots(2n-1)}{n!} \cdot 2^{n-1}$

(2) $\frac{1.3.5\ldots\ldots(2n-1)}{n!} \cdot 2^{n}$

(3) a.3.5……(2n-1) $.2^n$

(4) none of these

15. $(1-x)^3$ is equal to :

(1) x^3+3x^2+3x-1 (2) x^3-3x^2+3x-1
(3) x^3-3x^2-3x+1 (4) x^3+3x^2+3x+1

16. If n ∈ N, then $\overset{n}{\underset{m=1}{}}$ m2 is equal to :

(1) $\frac{m(m+1)(2m+1)}{6}$

(2) $\frac{n(n-1)(2n-1)}{6}$

(3) $\frac{m((m-1)(2m-1)}{6}$

(4) $\frac{n(n+1)(2n+1)}{6}$

17. If A.M. and H.M. between two numbers are 27 and 12 respectively then their G.M. is:

(1) 9 (2) 18 (3) 24 (4) 36

18. If $\frac{1}{q+r}$, $\frac{1}{r+p}$, $\frac{1}{p+q}$, are in A.P. then :

(1) p2,q2, r2 are in A.P.
(2) p,q,r are in A.P.
(3) p,q,r are in G.P.
(4) $\frac{1}{p}$, $\frac{1}{q}$, $\frac{1}{r}$ are in A.P.

19. If α and β are the roots of the equation $x^2 - ax + b = 0$ and $v_n = \alpha^n + \beta^n$ then :

(1) $v_{n+1} = av_n + bv^{n-1}$
(2) $v_{n+1} = bv_n - av_{n-1}$
(3) $v^{n+1} = av_n - bv_{n-1}$
(4) $v^{n+1} = bv_n + av_{n-1}$

20. If α and $\frac{1}{\alpha}$ are the roots of the equation $5x^2+13x+k = 0$ then k will be:

(1) 5 (2) – 5 (3) 13 (4) 1

21. The value i^3-i^5-i^{10}-i^{16} will be :

(1) 0 (2) i (3) – 2 – 2i (4) 2 – 2i

22. A coin tossed m + n (m > n) , times then the probability that the head appears m times continuosly is :

(1) $\frac{m+n}{2^{m+n}}$ (2) $\frac{n+2}{2^{m+1}}$ (3) $\frac{m}{2^{m+n}}$ (4) $\frac{m+2}{2^{n+1}}$

23. For any two events A and B if $P(A \cup B) = 5/6$, $P(A \cap B) = 1/3$, $P(B) = ½$ then P(A) is :

(1) ½ (2) 2/3 (3) 1/3 (4) none of these

24. If M and N are any two events , then the probability of happening exactly one event is:

(1) P(M) + P(N) – P(MN)
(2) P(M) + P(N) – 2P(MN)
(3) $P(\bar{M}) + P(\bar{N}) + 2P(\bar{M}\bar{N})$

(4) none of these

25. A bag contains 3 white and 5 black balls. One ball is drawn at random. Then the probability that it is black is :

(1) $\frac{1}{8}$ (2) $\frac{3}{8}$ (3) $\frac{5}{8}$ (4) $\frac{3}{5}$

26. A box contains 100 bulbs, out of these 10 are used. 5 bulbs are choosen at random. Then the probability that no one is fused is :

(1) $\left(\frac{9}{10}\right)^5$ (2) $\frac{^{90}C_5}{^{100}C_5}$ (3) $\left(\frac{1}{2}\right)^5$ (4) 10^{-5}

27. For any two events A and B the correct statement is :

(1) $P(A \cap B) \leq P(A) + P(B)$
(2) $P(A \cap B) \leq P(A) + P(B) - 1$
(3) $P(A \cap B) \geq P(A) + P(B) - 1$
(4) $P(A \cap B) \geq P(A) + P(B)$

28. For any non zero vector $\vec{a}$ the correct statement is :

(1) $\vec{a} \cdot \vec{a} \leq 0$ (2) $\vec{a} \cdot \vec{a} = 0$ (3) $\vec{a} \cdot \vec{a} > 0$ (4) $\vec{a} \cdot \vec{a} \geq 0$

29. $\vec{a} \cdot (\vec{b} \times \vec{c}) = 0$ then the correct statement is :

(1) out of $\vec{a}, \vec{b}, \vec{c}$ any two vectors are parallel
(2) $\vec{a}, \vec{b}, \vec{c}$ are coplanar
(3) any two are equal $\vec{a}, \vec{b}, \vec{c}$
(4) at least one above statement is correct

30. If $\vec{A} \times \vec{B} = 0$ where $\vec{A}$ and $\vec{B}$ are non zero vectors then :

(1) $\vec{A}$ and $\vec{B}$ are perpendicular to each other

(2) the angle between $\vec{A}$ and $\vec{B}$ is π

(3) $\vec{A}$ and $\vec{B}$ parallel vectors

(4) $\vec{B}$ is unit vector

^^ ^^ ^^ ^^ ^^ ^^

31. If $2i + j - k$ and $i - 4j + \lambda k$ are perpendicular to each other then λ is equal to:

(1) – 3 (2) – 2 (3) – 1 (4) 0

32. If $\frac{d}{dx} \phi(x) = f(x)$ then $\int_{1}^{2} f(x)\, dx$ is equal to :

(1) $f(1) - f(2)$ (2) $\phi(1) - \phi(2)$ (3) $f(2) - f(1)$ (4) $\phi(2) - \phi(1)$

33. If $f(a - x) = f(x)$, then $\int_{0}^{a} xf(x)\, dx$ is equal to :

(1) $\int_{0}^{a} f(x)dx$ (2) $a \int_{0}^{a/2} f(x)dx$ (3) $a \int_{0}^{a} f(x)dx$ (4) none of these

34. $\int_{-a}^{a} f(x)dx = 2 \int_{0}^{a} f(x)dx$ when :

(1) $f(2a-x) = - fx$ (2) $f(2a-x)=f(x)$ (3) $f(-x)=-f(x)$ (4) $f(-x)=f(x)$

35. $\int_{0}^{2} |1 - x|dx$ is equal to :

(1) 0 (2) 1 (3) $\frac{3}{2}$ (4) $\frac{1}{2}$

36. For any integer n the value of $\int_{0}^{\pi\pi} e^{\cos 2} \cos^3 (2n+1)x\, dx$ will be:

(1) e^2 (2) 0 (3) 1 (4) e

37. $\int \frac{\sin 2x}{\sin^4 x + \cos^4 x} dx$ is equal to :

(1) $2 \tan^{-1} (\tan^2 x) + C$
(2) $\tan^{-1} (x \tan^2 x) + C$
(3) $\tan^{-1} (\tan^2 x) + C$
(4) none of these

38. $\int \frac{1}{x^5} dx$ is equal to :

(1) $-\frac{1}{5x^4} + C$ (2) $-\frac{1}{5x^6} + C$ (3) $-\frac{1}{4x^4} + C$ (4) $\frac{-5}{x^6} + C$

39. The function sin x + cos x is maximum when x is equal to :

(1) $\frac{\pi}{6}$ (2) $\frac{\pi}{4}$ (3) $\frac{\pi}{3}$ (4) $\frac{\pi}{2}$

40. If the normal to a curve is parallel to axis of x, then the correct statement is :

(1) $\frac{dx}{dy} = -1$ (2) $\frac{dx}{dy}$ (3) $\frac{dx}{dy} = 0$ (4) $\frac{dy}{dx} = 0$

41. $\frac{d}{dx}\sin^{-1} x$ is equal to :

(1) $-\frac{1}{\sqrt{x^2-1}}$ (2) $\frac{1}{\sqrt{x^2-1}}$ (3) $\frac{1}{\sqrt{1-x^2}}$ (4) $-\frac{1}{\sqrt{1-x^2}}$

42. The differential coefficient of e^{x-3} is :

(1) $2x^3e^{x3}$ (2) $3x(e^{x3})$ (3) e^{x3} (4) $3x^2e^{x3}$

43. $\frac{d}{dx}(x^x)$ is equal to :

(1) $x^x \log (e/x)$ (2) $x^x \log ex$ (3) $\log ex$ (4) $x^x \log x$

44. $\lim_{x \to a}$ [f(x),g(x)] will exist, when :

(1) $\lim_{x \to a} \frac{f(x)}{g(x)}$ is exists

(2) $\lim_{x \to a} [f(x)]^{g(x)}$ is exists

(3) $\lim_{x \to a}$ f (x) or lim g(x) is exists

(4) $\lim_{x \to a}$ f (x) and $\lim_{x \to a}$ g(x) both exists

45. $\lim_{x \to 0} \frac{\sin x}{x}$ is equal to :

(1) 2 (2) – 1 (3) 1 (4) 0

46. If f(x) = sin [x] , [x] $\neq 0$ where [x] is a greatest integer less or equal to x then $\lim_{x \to 0}$ f(x) is equal to :

(1) – 1 (2) 0 (3) 1 (4) does not exist

47. If A = {-2, -1, 0, 1,2} and f:A → R such that f(x) = x^2 + 1, then the range of f will be:

(1) {1, ± 2, ±5} (2) {1,2,5} (3) {-2, -1, 0, 1,2} (4) none of these

48. The point (at3, at2) will lies on the curve :

(1) $x^3 = ay^2$ (2) $x^2 = ay$ (3) $y^2 = ac$ (4) $y^3 = ax^2$

49. The diameter of the circle $x^2 + y^2 + 4x - 6y = 0$, is :

(1) $\sqrt{52}$ (2) $\sqrt{13}$ (3) $\sqrt{26}$ (4) $\sqrt{20}$

50. The pole of the line $\tau x + my + n = 0$ w.r.t. the circle $x^2 + y^2 = a^2$ is :

(1) $\left(-\frac{n}{1}a^2, -\frac{n}{m}a^2\right)$

(2) $\left(-\frac{a}{na^2}, \frac{m}{ma^2}\right)$

(3) $\left(-\frac{1}{n}a^2, \frac{m}{n}a^2\right)$

(4) $\left(\frac{1}{n}a^2, -\frac{m}{n}a^2\right)$

51. Two dice thrown together then the probability of getting a sum of 7, is :

(1) $\frac{7}{36}$ (2) $\frac{6}{36}$ (3) $\frac{5}{36}$ (4) $\frac{8}{36}$

52. For any two events A and B, $P(A\cap\overline{B})$ is equal :

(1) $P(A) - P(A\cap B)$ (2) $P(A) - P(A \cap B)$

(3) $P(A) - P(A\cup B)$ (4) $P(A) + (\overline{A} \cap \overline{B})$

53. If A and B are two events, then $P(\overline{A / B})$ is equal to :

(1) $P(\overline{A}) / P(\overline{B})$ (2) $\frac{1-P(A+B)}{P(\overline{B})}$

(3) $\underline{1- P(AB)}$ (4) $1- P(A/B)$

$P(B)$

54. If $A \subseteq B$, then $B \cup A$ will be :

(1) [0] (2) ϕ (3) A (4) B

55. $P\left(\dfrac{\bar{A}}{A \cup B}\right)$ is equal :

(1) $\dfrac{P(A)}{P(A \cup B)}$ (2) $\dfrac{P(\bar{A} \cap B)}{P(A \cap B)}$ (3) $\dfrac{P(\bar{A})}{P(A \cup B)}$ (4) $\dfrac{P(\bar{B})}{P(A \cup B)}$

56. The period of $\sin^4 x + \cos^4 x$ will be :

(1) $\dfrac{3\pi}{2}$ (2) 2π (3) π (4) $\dfrac{\pi}{2}$

57. $\vec{a} \times (\vec{b} \times \vec{c})$ is equal to :

(1) $(\vec{a} \cdot \vec{c})\,\vec{b} - (\vec{a} \cdot \vec{b}) \cdot \vec{c}$

(2) $(\vec{a} \cdot \vec{c})\,\vec{b} + (\vec{a} \cdot \vec{b}) \cdot \vec{c}$

(3) $(\vec{a} \cdot \vec{b})\,\vec{c} + (\vec{a} \cdot \vec{b}) \cdot \vec{c}$

(4) $(\vec{a} \cdot \vec{b})\,\vec{c} - (\vec{a} \cdot \vec{c}) \cdot \vec{b}$

58. The angle between the vectors (i+j) abd (j+k) is

(1) $\dfrac{\pi}{4}$ (2) 0 (3) $\dfrac{\pi}{4}$ (4) $\dfrac{\pi}{3}$

59. The area of the region bounded by the curves $y = x \sin x$, axis of x, $x = 0$ and $x = 2\pi$ will be :

(1) 8π (2) 4π (3) 2π (4) π

60. $\int_0^{\pi/2} \log \sin x \, dx$ is equal to :

(1) $\pi \log\left(\dfrac{1}{2}\right)$ (2) $\pi \log 2$ (3) $\pi \log\left(\dfrac{1}{2}\right)$ (4) $\dfrac{\pi}{2} \log 2$

61. $\int_a^b f(x)\, dx$ is equal to

(1) $\int^{b} f(x-a-b)\, dx$ (2) $\int^{a} f(a-x)dx$ (3) $\int^{b} f(a+b-x)dx$ (4) noneof these

62. $\int_0^{\pi/2} \sin 2x \log \tan x \, dx$ **is equal to :**

(1) 2π (2) π (3) 0 (4) $\pi/2$

63. $\int_0^{\pi} \cos^3 x \, dx$ **is equal to :**

(1) 4π (2) 2π (3) π (4) 0

64. $\int_0^{\pi/2} \frac{1}{1+\sqrt{\tan x}} \, dx$ **is equal to :**

65. $\int \cot x \, dx$ **is equal to :**

(1) log tan x + C (2) log sec x + C

(3) log cosec x + C (4) log sin x + C

66. If z = x + y iy then |z – 5| is equal to :

(1) $\sqrt{(x-y)^2 + 5^2}$ (2) $\sqrt{(x-5)^5 + y^2}$

(3) $\sqrt{x^2 + (y-5)^2}$ (4) $\sqrt{(x-5)^2 + (y-5)^2}$

67. If α and β are the roots of the equation $4x^2 + 3x + 7 = 0$ then $\frac{1}{\alpha} + \frac{1}{\beta}$ is equal is :

(1) $\frac{7}{3}$ (2) $\frac{2}{7}$ (3) $\frac{-3}{7}$ (4) $\frac{3}{7}$

68. $2,\overline{357}$ is equal to :

(1) $\frac{2379}{999}$ (2) $\frac{2355}{999}$ (3) $\frac{2355}{997}$ (4) none of these

69. If the second term of a G.P. is 2 and the sum of its infinite terms is 8, then its first therm is :

(1) 2 (2) 4 (3) 6 (4) 8

70. (1+2+3+….+n) is equal to :

(1) $\left(\frac{n(n+1)}{2}\right)^2$ (2) n^2 (3) $\frac{n(n+1)}{2}$ (4) $\frac{n(n-1)}{2}$

71. For $n \in N$, $2^{3n} - 7n - 1$ is divisible by :

(1) 50 (2) 49 (3) 51 (4) 48

72. If $x = 2 + 2^{1/3} + 2^{2/3}$, then $x^3 - 6x^2 + 6x$ is equal to :

(1) 0 (2) 1 (3) 2 (4) 3

73. If $(1-x)^n = C_0 + C_1x + \ldots + C_nx^n$ then $C_1 + 2C_2 + 3C_3 + \ldots + nC_n$ is equal is :

(1) $n.2^{n-1}$ (2) $(n-1)^{2n-1}$ (3) $(n+1)^{2n}$ (4) $2^{n-1} - 1$

74. Determinate $\begin{vmatrix} 1+ib & c+id \\ c-id & a-ib \end{vmatrix}$ **is equal to :**

(1) $a^2-b^2+c^2+d^2$ (2) $a^2+b^2-c^2-d^2$

(3) $(a^2+b^2)(c^2+d^2)$ (4) $(a+b)(a-b)$

75. $\begin{vmatrix} 43 & 1 & 6 \\ 35 & 7 & 4 \\ 17 & 3 & 2 \end{vmatrix}$ **is equal to:**

(1) – 6 (2) – 110 (3) 0 (4) 150

76. If A = $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ **then A2 is equal to:**

(1) $\begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}$ (2) $\begin{pmatrix} 0 & 0 \\ 0 & 1 \end{pmatrix}$ (3) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ (4) $\begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$

77. If A = $\begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix}$ **then A^n is equal to :**

(1) $\begin{pmatrix} 1 & n^n \\ 0 & 1 \end{pmatrix}$ (2) $\begin{pmatrix} n & n \\ 0 & n \end{pmatrix}$ (3) $\begin{pmatrix} 1 & n \\ 0 & 1 \end{pmatrix}$ (4) $\begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix}$

78. If A and B are the invertible matrix of the required order then the value of $(AB)^{-1}$ will be :

(1) $[(AB)']^{-1}$ (2) $A^{-1}B^{-1}$ (3) $B^{-1}A^{-1}$ (4) $(BA)^{-1}$

79. The value of sin 3x is :

(1) $4 \sin x - 3 \sin^3 x$ (2) $4 \sin x + 3 \sin^3 x$

(3) $3 \sin x - 4 \sin^3 x$ (4) $3 \sin x + 4 \sin^3 x$

80. The imaginary roots of $(-1)^{1/3}$ is :

(1) $\frac{1 \pm \sqrt{3}i}{4}$ (2) $\pm i$ (3) $\frac{-1 \pm \sqrt{3}}{2}$ (4) $\frac{1 \pm \sqrt{3}i}{2}$

81. The argument and modulus of the $e^{\sin i\theta\theta}$ is :

(1) 1, sin hθ (2) 1, π/2 (3) $e^{\cos}$ θ, sin hθ (4) $e^{\sin}$ θ, sin hθ

82. The minimum distance of a point (x, y) from a line ax + by + c = 0, is :

(1) $\frac{|ax1 - by1 - c|}{\sqrt{a^2 + b^2}}$ (2) $\frac{|ax1 - by1 - c|}{\sqrt{a^2 + b^2 - c}}$

(3) $\frac{|ax1 + by1 + c|}{\sqrt{a^2 + b^2 + c^2}}$ (4) $\frac{|ax1 + by1 + c|}{\sqrt{a^2 + b^2 + c}}$

83. A straight line through (1, 1) and parallel to the line $2x + 3y - 7 = 0$ is :

(1) $2x + 3y + 5 = 0$ (2) $3x - 2y + 7 = 0$

(3) $3x + 2y - 8 = 0$ (4) $2x + 3y - 5 = 0$

84. Equation of the straight line passing through the points (-1, 3) and (4, -2) is :

(1) $x - y = 3$ (2) $x + y = 3$ (3) $x - y = 2$ (4) $x + y = 2$

85. The general equation of circle passing through the point of intersection of circle S = 0 and line P = 0, is :

(1) $S + \lambda P = 0, \lambda \in R$ (2) $6S + 4P = 0$

(3) $3S + 4P = 0$ (4) $4S + 5P = 0$

86. The equation of the radial axis of two circle $x^2 + y^2 + 2g_1x + 2f_1y + c_1 = 0$ and $x^2 + y^2 + 2g_2x + 2f_2y + c_2 = 0$, is :

(1) $2 (g_1 - g_2) x + 2 (f_1 - f_2) y - c_1 - c_2 = 0$

(2) $2 (g_2 - g_1) x + 2 (f_1 - f_2) y + c_1 - c_2 = 0$

(3) $2 (g_1 - g_2) x + 2 (f_1 - f_2) y + c_1 - c_2 = 0$

(4) $2 (g_1 - g_2) x + 2 (f_1 - f_2) y + c_2 - c_1 = 0$

87. If f (x) = cos (log x), then $f(x) f(y) - 1 [f(\frac{x}{y}) - f(xy)]$ is equal to :

(1) 0 (2) f(x+y) (3) $f(\frac{x}{y})$ (4) f(xy)

88. If $f(x) = \frac{x}{x - 1} = y$, then the value of f(y) is :

(1) $1 - x$ (2) $x + 1$ (3) $x - 1$ (4) x

89. $\lim_{n \to \infty} \left(\frac{1^2}{13 + n3} + \frac{2^2}{23 + n3} + \frac{1}{2n} \right)$ is equal to :

(1) $\frac{1}{2} \log 2$ (2) $3 \log 2$ (3) $\frac{1}{3} \log 2$ (4) $\frac{1}{2} \log 3$

90. $\lim_{x \to a} \frac{x2 - a2}{x - a}$ is equal to :

(1) ∞ (2) 0 (3) a (4) 2a

91. $\frac{d}{dx} (2^x)$ is equal to :

(1) 1 (2) $2^x \log 2$ (3) $x \log 2$ (4) 0

92. Differential coefficient of x^3 w.r.t. x^2 will be :

(1) $\frac{3}{2x}$ (2) $\frac{2}{3x}$ (3) $\frac{3}{2}x$ (4) $\frac{3x^2}{2}$

93. $\frac{d}{dx}$ (tan x) is equal to :

(1) $\mathrm{cosec}^2 x$ (2) sec x tan x (3) cosec x cot x (4) $\sec^2 x$

94. The coordinates of the point where the tangent to the curve x2 + y2 – 2x – 3 = 0 is parallel to the axis of x is :

(1) $1. \pm\sqrt{3}$ (2) (1,0) (3) $1, \pm 2$ (4) $(1. \pm\sqrt{2})$

95. The point at which tangent to the curve $y = \tau\tau^{2x}$ at the point (0, 1) meets the x-axis is :

(1) (1, 0) (2) (- ½, 0) (3) (2, 0) (4) (0, 2)

96. Maximum value of slope of a tangent to the curve $y = -x^3 + 3x^2 + 2x - 27$ will be :

(1) 11 (2) – 4 (3) 5 (4) 2

97. m $\frac{\sin\sqrt{x}}{\sqrt{x}}$ dx is equal to :

(1) $-2\cos\sqrt{x} + C$ (2) $2\cos\sqrt{x} + C$ (3) $2\sin\sqrt{x} + C$ (4) $\sin\sqrt{x}+C$

98. Correct statement is :

(1) $(AB)^{-1} = B^{-1}A^{-1}$ (2) $(AB)^{-1} = A^{-1}B^{-1}$ (3) $(AB)^T = A^TB^T$ (4) $(AB)^{-1} = A^{-1}B^{-1}$

99. If the matrix P = $\begin{pmatrix} 1 & 2 \\ -3 & 0 \end{pmatrix}$ and Q = $\begin{pmatrix} -1 & 0 \\ 2 & 3 \end{pmatrix}$ then the correct statement is :

(1) P + Q = I (2) $PQ \neq QP$ (3) $Q^2 = Q$ (4) $P^2 = P$

ANSWER SHEET

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

RAJASTHAN P.E.T.
PHYSICS – 1995

1. The field at distance r from the center of a charge conducting sphere of radius R and charge Q is given by the expression (r < R) :

(1) $\frac{KQ}{r^2}$ (2) $\frac{KQ}{R^2}$ (3) $\frac{KQR}{R^2}$ (4) zero

2. An electron of 10 eV kinetic energy will travel the distance through an electric field 0.25 N/C :

(1) 2.5 m (2) 20 m (3) 4 m (4) 40 m

3. The length of potentiometer wire is 10 cm. and resistance is 0.005 Ωcm. A battery of 2 Volt enf and 1.5 Ω internal resistance is connected to the wire will be:

(1) 4×10^{-4} v/cm. (2) 0.05 v/cm. (3) 0.5 v/cm. (4) 0.005 v/cm.

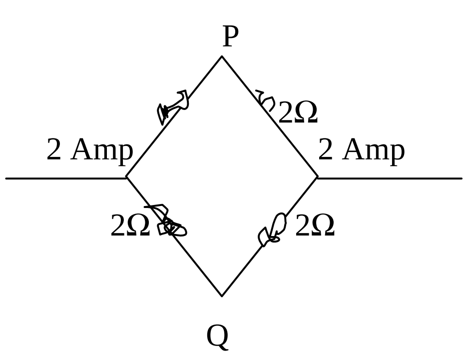
4. Two coils are placed very near to each other. If the current in primary coil is I = I0 sin ωt and coefficient of mutual induction is M, the induced emf in secondary coil will be :

(1) $E = \frac{I_0\omega \cos \omega t}{M}$ (2) $E = \frac{I_0\omega \cos \omega t}{M}$ (3) $E = \underline{MI_0\omega \cos \omega t}$ (4) $E = \underline{-MI_0\omega \cos \omega t}$

5. Choke coil is :

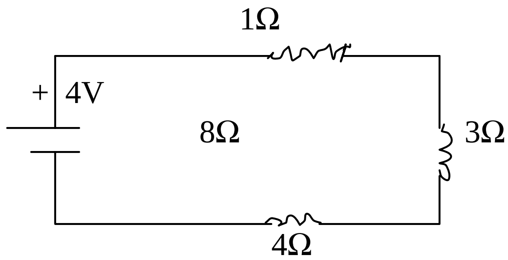
(1) induction coil of high resistance and high inductance
(2) induction coil of high resistance and low inductance
(3) induction coil of low resistance and high inductance
(4) induction coil of low resistance and low inductance

6. The voltage difference between P and Q is :



(1) 2 volt (2) 1 volt (3) – 1 volt (4) – 2 volt

7. In the circuit current in 8Ω resistance is :



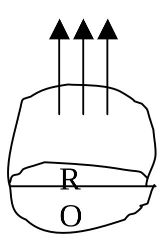
(1) 2 amp. (2) 1 amp. (3) 0.5 amp. (4) 1.25 amp.

8. Which is correct for inside charged sphere :
(1) $E \neq 0$, $V = 0$ (2) $E=0$, $V= 0$ (3) $E\neq0$, $V\neq0$ (4) $E=0$, $V = 0$

9. The magnetic force experienced charge q in magnetic field moving with velocity V, will maximum when the angle between V and B is :
(1) 0^0 (2) 45^0 (3) 90^0 (4) 180^0

10. A parallel plate condenser is charged with a battery. After changing of the condenser battery is removed and two plates are separated from each other with the help of insulating handles, than :
(1) capacitance decreases
(2) capacitance increases
(3) charge on plates increases
(4) voltage between plates increase

11. The electrical flux from a semi spherical will be :



(1) $\pi R^2 E$ (2) $\frac{4}{3}\pi R^2 E$ (3) $2\pi R^2 E$ (4) $2\pi RE$

12. In closed organ pipe the produced harmonics are :
(1) no harmonics is produced
(2) even and odd both
(3) odd only
(4) even only

13. In this wave equation $Y = 5 \sin 2\pi(4t - 0.02x)$ the wave velocity of wave is :
(1) 50 m/sec. (2) 150 m/sec. (3) 200 m/sec. (4) 100 m/sec.

14. Light velocity in vacuum depends upon :
(1) wavelength (2) frequency (3) intensity (4) none of these

15. In a coil the current changes from 2A to 4A, 0.05 sec. and the induced enf is 8 volt, the coefficient of self induction will be :
(1) 8H (2) 0.02 H (3) 0.2 H (4) 0.8 H

16. The resistance of a galvanometer is 100 Ω and maximum current which can pass through it 0.001 A. The value of shunt to change this galvanometer into voltmeter of 12 volt range will be :
(1) 12,100 Ω (2) 11,900 Ω (3) 1190 Ω (4) 11,990 Ω

17. The AC voltage is given by the equation $E = E_0 \sin \omega t$, if an inductance is connected in the circuit the RMS value of voltage in the circuit will be:

(1) $E_{rms} = \frac{E_0}{2}$

(2) $E_{rms} = \frac{E_0}{\sqrt{2}}$

(3) $Erms = E_0$

(4) $Erms = \sqrt{2}\, E_0$

18. In wattles current phase difference between current and voltage is :
(1) $\pi/4$ (2) $\pi/2$ (3) π (4) zero

19. The ionization potential of hydrogen is 13.6 eV. The total energy of an electron in its third orbit will be :
(1) 3.4 eV (2) – 3.4 eV (3) 1.5 eV (4) – 1.5 eV

20. In radioactive dis-integration the element shift by one place further after the emission of the particle :
(1) α-particle (2) β-particle (3) γ-particle (4) α,β and γ all

21. A metal surface emitted electrons of 3 eV, when a light of 4 eV are made to incident on the same metal surface the energy of the emitted photons will be :
(1) 3 eV (2) 4 eV (3) 5 eV (4) 2 eV

22. If for an electron $m_e = 10^{-31}$ kg., velocity is 10^5 m/s., $h = 10^{-34}$, the uncertainty in the position of electron will be of the order of :
(1) 10^{-4} m (2)10^{-8} m (3) 10^{-6} m (4) 10^{-8} m

23. Forbidden energy gap in Ge is :
(1) 0.75 eV (2) 2.5 eV (3) 1.1 eV (4) 5 eV

24. A rod of length L and mass M is suspended from its one end and execute oscillations the time period of vibrations will be :

(1) $T = 2\pi \sqrt{\frac{2L}{g}}$

(2) $T = 2\pi \frac{\sqrt{L}}{g}$

(3) $T = 2\pi \frac{\sqrt{1L}}{2g}$

(4) $T = 2\pi \frac{\sqrt{2L}}{3g}$

25. Two masses m_1 and m_2 are attached to the ends of a string by a weight loss rod of length r_0. The MI of this system about the axis passing through the center of mass and perpendicular to its length will be :

$$\left(\mu\, 0 = \frac{m_1\, m_2}{m_1 + m_2} \right)$$

(1) $\mu_0 r_0^2$ (2) $\mu_0 r$ (3) $\mu_0 r^2$ (4) $\mu_1 r_0^2$

26. The energy of monatomic gas is :
(1) only rotational (2) only vibrational (3) only translatory (4) all the above

27. The work done in increasing the size of a bubble by 10^{-2} m^2 (T = 25 dyne 1 cm.) :
(1) 0.4×10^{-4} erg (2) 50×10^{2} erg
(3) 25×10^{2} erg (4) 25×10^{-2} erg

28. **A geostationary satellite is at a distance of 8 Re revolving around the earth and another satellite is revolving round the earth at 3.5 Re distance, its revolution period** will be:
(1) 8.5 hrs. 92) 16.5 hrs. (3) 18 hrs. (4) 12 hrs.

29. The work done per unit extension in length of a wire will be (L = length, A = area of cross section) :
(1) $\frac{YL^2}{2A}$ (2) $\frac{YA}{2L^2}$ (3) $\frac{YA}{2L}$ (4) $\frac{YL}{2A}$

30. The total energy of a body at distance r from the earth will be :

(1) $-\frac{Gm_em}{r}$ (2) $-\frac{Gm_em}{2r}$ (3) $\frac{Gm_em}{2r}$ (4) $\frac{Gm_em}{r}$

31. The kinetic energy of a particle executing SHM is changed by frequency f, the frequency of its motion will be :

(1) f/2 (2) f (3) 2f (4) 4f

32. A body of mass m is projected at an angle 45^0 with velocity v from the horizontal the angular momentum acceleration at the heighest point of he motion will be :

(1) mv (2) $\frac{mv^2}{4g}$ (3) $\frac{mv^3}{4\sqrt{2}g}$ (4) $\frac{mv}{2}$

33. The mass of bob of simple pendulum is m. This bob is life by ehight h and than set free; the work done in displacement of the bob from one end to another will be :

(1) 2 mgh (2) $\frac{1}{2}$ mgh (3) mgh (4) zero

34. A boy is revolving on a dice with spreading hands. Suddenly the boy brings his near his body, the change in the system will be :

(1) angular velocity increases
(2) angular velocity decreases
(3) angular velocity unchanged
(4) angular momentum decreases

35. A body moving with 50 m/sec. Velocity collides elastically with another body at rest. After the collision the velocity of first body changes to 30 m/sec., the velocity of the second body will be:

(1) 30 m/sec. (2) 60 m/sec. (3) 80 m/sec. (4) 50 m/sec.

36. The radius of a circular aperture is variable. The light of λλwavelength is made to incident on the aperture a screen is placed at distance b from the aperture. When one increases the radius of the aperture, the value of the radius of aperture for which second time dark point will be obtained on the screen will be :

(1) $\sqrt{b\lambda}$ (2) $\sqrt{3b\lambda}$ (3) $\sqrt{4b\lambda}$ (4) $\sqrt{2nb\lambda}$

37. The length of a sonometer wire is ττand tension T and frequency is n. If the length and tension on sonometer wire are doubled the frequency will become :

(1) 2n (2) $\frac{n}{2}$ (3) $\sqrt{2n}$ (4) $\frac{n}{\sqrt{2}}$

38. Two forks of approximately equal frequencies are used to produce Lissajou figures. If the Lissajous figure changes its shape once in 1 sec. If the frequency of one of the tuning fork is 1000 Hz, the frequency of second fork will be :

(1) 1000 Hz (2) 1002 Hz (3) 2000 Hz (4) 1001 Hz

39. Fundamental frequency of an open pipe is :

(1) 15 Hz (2) 20 Hz (3) 30 Hz 94) 10 Hz

40. If charge Q is placed at the center of a cube, the emergent flux from one of the face of the cube will be:

(1) $\frac{Q}{2\varepsilon_0}$ (2) $\frac{Q}{3\varepsilon_0}$ (3) $\frac{Q}{6\varepsilon_0}$ (4) $\frac{Q}{\varepsilon_0}$

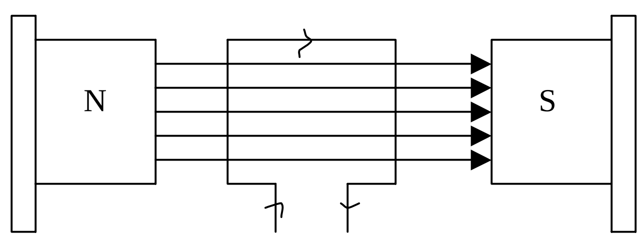
41. Two equal charges each of value q are placed on a straight line, another charge Q is placed at mid of the distance between the system will be most stable is :

(1) $+\frac{q}{2}$ (2) $-\frac{q}{2}$ (3) $+\frac{q}{4}$ (4) $-\frac{q}{4}$

42. An electron passes through an electric field 3200 v/m. of length 0.1 m. with speed 4 x 10^7 m/sec. The deflection produced in the path of electron will be :

(1) 3.52 mm. (2) 1.35 mm. (3) 0.88 mm. (4) 1.76 mm.

43. A rectangular coil placed in a magnetic field 0.25 T. The area of coil is 96 x 10-4 m2, no. of turns are 50 and current is 2A, the torque experienced by the coil will be:

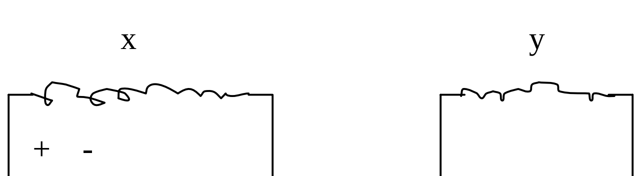


(1) 0.24 N-m. (2) 0.48 N-m. (3) 0.36 N-m. (4) 0.96 N-m.

44. If two charged conductors are short circuited by a wire, the current will now flow:

(1) sizes are equal
(2) capacitances are equal
(3) charges are equal
(4) potential are equal

45. Two coils X and Y are placed near to other according to the figure. If current is passed through X, the direction of induced current in Y will be:



(1) carit be determined (2) no current induce
(3) Q to P (4) P to Q

46. Which quantity doesn't remains constant in simple harmonic motion :
(1) time period (2) velocity (3) frequency (4) amplitude

47. A pot filled with water is revolved in the circular path of radius R, the minimum velocity at which the water will not come out of the pot will be :

(1) gR (2) $\sqrt{2gR}$ (3) $\sqrt{Rg}$ (4) $\sqrt{5gr}$

48. A spring is extended by ι length, then the force is :
(1) $F = \frac{k}{\iota}$ (2) $F = k\iota$ (3) $F = \frac{k}{\iota^2}$ (4) $F = \frac{k^2}{\iota}$

49. The velocity at which a body will escape from the earth surface is (M_e = mass of earth R_e = radius of earth) :

(1) $V \le \sqrt{\frac{2GM_e}{R_e}}$ (2) $V \ge \sqrt{\frac{2GM_e}{R_e}}$

(3) $V \le \sqrt{\frac{GM_e}{R_e}}$ (4) $V \ge \sqrt{\frac{GM_e}{R_e}}$

50. The initial temperature of a gas is 27^0 C. The gas is compressed adiabatically to $1/9^{th}$ of its initial volume, the final temp. of the gas will :
(1) 627^0K (2) 627^0C (3) 727^0C (4) 900^0C

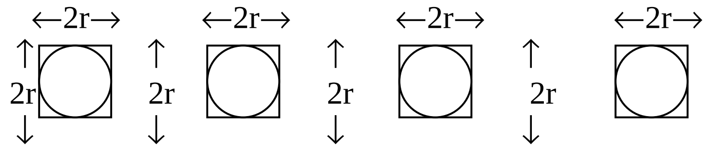
51. The workdone in expanding a gas from 10 m^3 to 20 m^3 at one atmospheric pressure will be :
(1) 10^6 J (2) 10^3 J (3) 10^2 J (4) 10^5 J

52. The mean kinetic energy of the molecule at a given temp. will be max. for :
(1) Hydgrogen (2) Oxygen (3) Helium (4) Equal for all

53. Kind of bonding in H_2 is :
(1) covalent (2) vander waals (3) ionic (4) metallic

54. The density of iron is 7 x 10^3 k/m^3 and breaking stress is 7.9 x 10^8 N/m2, the max, length of the wire which will unable to break the wire from its own weight will be:
(1) 10^5 M (2) 10^3 M (3) 10^4 M (4) 10^2 M

55. Four bodies solid sphere, solid cylinder, disc and ring have same mass and same cross sectional area, the MI about the axis shown by a point in the figure will be max. for the body (the axis is perpendicular to the plane of the bodies) :



(1) only disc (2) sphere and ring
(3) disc and cylinder (4) only ring

56. A cylinder rools down the inclined plane of length 0.15 m. If the mass of cylinder is 0.1 kg. The velocity at the bottom of the inclined plane will be:
(1) 3.5 m/sec. (2) 2 m/sec. (3) 1.4 m/sec. (4) 2.4 m/sec.

57. A stopper is attached in the middle of glass tube. Two bubbles of radius 2 cm. and 4 cm. are formed at the end of the glass tube. If one opens the stopper :
(1) small bubble will reduce and large will increase
(2) both will increase
(3) both will reduce
(4) small will increase and large will reduce

58. A 500 μF capacitor is charged with a battery of 100 volt and it is discharged through 10 Ω resistance the heat produced in resistance will be:
(1) 1.25 J (2) 5 J (3) 10 J (4) 2.5 J

59. Two condensers of 1 μF are connected in series with a battery of 6 volt, the total charge on condensers will be :
(1) 2 μC (2) 2.5 μC (3) 9 μC (4) 4 μC

60. Transformer changes :
(1) DC current (2) DC voltage (3) AC voltage (4) AC & DC voltage

61. Lenzis law is based upon :
(1) law of conservation of energy
(2) law of conservation of angular momentum
(3) law of conservation of momentum
(4) law of conservation of charge

62. Two thin wires are separated by distance r and parallel to each other. If the current in each wire is I, the force per unit length experienced by one wire due to current in the other will be :
(1) $\frac{\mu_0 I^2}{2\pi r2}$ (2) $\frac{\mu_0 I^2}{4\pi r}$ (3) $\frac{\mu_0 I}{2\pi}$ (4) $\frac{\mu_0 I^2}{2\pi r}$

63. The relation between current and maximum current I_m at half power points in resonant circuit will be :

(1) $I = \frac{I_m}{2\sqrt{2}}$ (2) $I = I_m \sqrt{2}$ (3) $I = \frac{I_m}{2}$ (4) $I = \frac{I_m}{\sqrt{2}}$

64. In LCR circuit the voltage and current are given by the equations: $E = E_0 \sin \omega t$ and $I = I_0 (\omega t - \phi)$ than which statement is correct :

(1) $\cos \phi = \frac{R}{\left(\omega L - \frac{1}{C\omega}\right)}$

(2) $\sin \phi = \frac{\left(\omega L - \frac{1}{C\omega}\right)}{R}$

(3) $\tan \phi = \frac{\left(\omega L - \frac{1}{C\omega}\right)}{R}$

(4) $\tan \phi = \frac{\omega L}{R}$

65. The potential due to electric dipole a point is :

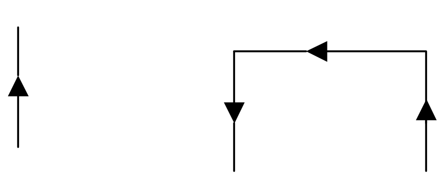
(1) $K \left(\frac{\vec{p} + \vec{r}}{r^3}\right)$ (2) $K \left(\frac{\vec{p} + \vec{r}}{r^3}\right)$

(3) $K \left(\frac{\vec{p} - \vec{r}}{r^3}\right)$ (4) $K \left(\frac{\vec{p} \cdot \vec{r}}{r^3}\right)$

66. The magnetic field due to a current carrying wire element will be maximum when the angle between the current element and position vector is :

(1) $\pi/2$ (2) $\pi/4$ (3) π (4) zero

67. A straight current carrying wire and loop are placed according to the figure. If the current is according to the figure :



(1) loop will move towards the wire
(2) loop will move away from the wire
(3) loop will rotate around the wire
(4) no change

68. The rate of heat produced in resistance of 10 Ω in a.c. circuit is 250 watt per sec. the current in the resistance will be :
(1) 0.5 amp. (2) 2.5 amp. (3) 5 amp. (4) 1.25 amp.

69. The mean life of a radioactive substance is equal to :
(1) $\frac{1}{\sqrt{\lambda}}$ (2) $\sqrt{\lambda}$ (3) $\frac{1}{\lambda}$ (4) λ

70. The half life of a radioactive substance is 25 days. The 25 gm. sample of this substance will reduce is 150 days to :

(1) 0.375 gm. (2) 0.75 gm. (3) 1.5 gm. (4) 4 gm.

71. The wavelengths associated with photons and electron are same, the ratio of their momentum will be :
(1) 1 : 1 (2) 2 : 1 (3) 1 : 3 (4) 1 : 3

72. Work function for a surface is equal to :
(1) ϕ = fermi energy – binding energy
(2) ϕ =fremi energy
(3) ϕ = binding energy – fermi energy
(4) ϕ = binding energy

73. If the pressure of a gas is doubled at constant temperature, then the velocity of sound in the gas becomes :
(1) unchanged (2) $\sqrt{2}$ times (3) half (4) double

74. In black body radiations for maximum emission the wavelength λ_m shifted with increase of temperature of black body :
(1) at some temp. towards shorter side and others towards longer side
(2) towards higher wavelength
(3) towards shorter wavelength
(4) no shift

75. If the temp. of a body is make amount of radiated energy will become :
(1) 16 times (2) half (3) two times (4) four times

76. If light ray is reflected from the denser medium, the path difference produced in the reflected ray will be :
(1) $\lambda/4$ (2) $\lambda/2$ (3) λ (4) zero

77. The one mole of an ideal gas is compressed adiabatically from temp. 27^0 C to 1020 C the work done in the process will be : (r = 1.5)

(1) 1000.25 J (2) – 1245 J (3) -928.75 J (4) -622.5 J

78. The absence of atmosphere on the surface of any planet is :

(1) V_{rms} is greater than escape velocity
(2) Average kinetic energy gas molecules is negligible to the gravitational force on the planet
(3) V_{rms} less than escape velocity
(4) None

79. In a closed container the mass of molecule is 3 x 10^{-27} kg. and velocity of molecule is 10 m/sec. If the no. of molecules in the container is 10^{24}, the pressure will be :

(1) 100 N/m^2 (2) 10 N/m^2 (3) 1 N/m^2 (4) 0.5 N/m^2

80. The heat given a system is Δ Q and change in internal energy of system is du and if work done is ΔW, the correct relation between all three quantities :

(1) ΔQ = ΔW-dU (2) dU=ΔQ-ΔW (3) ΔW= ΔQ+dU (4) ΔW=ΔQ-dU

81. Absorption coefficient of an ideal blackbody is :

(1) less then 1 (2) 1 (3) zero (4) infinity

82. The V^{rms} of O2 at 27^0 C is V on the same temp. the Vrms of atomic oxygen is V' than:

(1) $V' = \frac{V}{2}$ (2) $V' = \frac{V}{\sqrt{2}}$ (3) $V' = \frac{V}{2}$ (4) $V' = \sqrt{2}\,V$

83. If one gm. of water at 1000 C converted into vapour of 1000 C the external work done in this process will be :

(1) 2100 watt (2) 2100 erg (3) 2100 J (4) 2100 cal

84. Of which the velocity is equal to light velocity :

(1) cathode ray (2) X-rays (3) positive ray (4) all

85. In young double slit experiment the two coherent sources are separated by 2 mm. the distance of screen is 1m. If the fringe width is 0.03 cm. the wavelength of light will be:

(1) 6000 Å (2) 5890 Å (3) 5000 Å (4) 4000 Å

86. The horns of two cars emit the sound of natural frequency 240 Hz. One of the car is moving towards one observer with velocity 4 m/sec. and the other car is moving away from the observer with the same velocity. The no. of beat heard by the observer will be (V_{air} = 320 m/sec.) :

87. The max. value of magnetic field in a electric field 3.2 x 10^{-4} v/m (max. value) :

(1) 0.94 x 10^{-14} T (2) 0.94 x 10^{10} T (3) 1.07 x 10^{-12} T (4) 1.07x10^{-9}T

88. 1 amu is equal to :

(1) 931 MeV (2) 931 eV (3) 9.30 eV (4) 931 KeV

89. 1 amp. current flow is a circuit when a cellisconnected to 1 Ω resistance and 0.5 amp. to a 3 Ω resistance. The internal resistance of cell is :

(1) 2 Ω (2) 1.0 Ω (3) 1.5 Ω (4) 0.5 Ω

90. Function of a grid in a triode is :

(1) to increase plate voltage
(2) to decrease plate voltage
(3) to reduce the effect of space charge
(4) None

91. If $r_p = 3 \times 10^3$ Ω and g_m = 20 m. mho if triode is used as an amplifier and R_L = 6 kΩ, then voltage amplification is :

(1) 40 (2) 60 (3) 20 (4) 30

92. Ge at absolute temp is a :

(1) super cond. (2) conductor (3) semi conductor (4) insulator

ANSWER SHEET

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