Deeksha

ABHYAS KCET 2024

FREE TEST SERIES

MOCK TEST 2 PDF

QUESTION PAPER

Deeksha - CET

Subject	Topic	
C + M + P	Complete Syllabus	

Max. Marks: 180 **Duration: 3 Hours**

1. **This paper consists of 180 questions with 3 parts of Chemistry, Mathematics and Physics**

   - **Chemistry:** *(Q. No. 1 to 60) Multiple Choice Questions with one correct answer. A correct answer carries 1 Mark. No Negative marks.*
   - **Mathematics:** *(Q. No. 61 to 120) Multiple Choice Questions with one correct answer. A correct answer carries 1 Mark. No Negative marks.*
   - **Physics:** *(Q. No. 121 to 180) Multiple Choice Questions with one correct answer. A correct answer carries 1 Mark. No Negative marks.*

2. **The OMR sheet for 200 questions is to be used**

3. **Use of calculators and log tables is prohibited**

4. **Darken the appropriate bubble using a pen in the OMR sheet provided to you. Once entered, the answer cannot be changed. Any corrections or modifications will automatically draw a penalty of 1 mark**

5. **No clarification will be entertained during the examination. Doubts in the paper can be reported to the coordinator after the exam**

6. **If the details in the OMR Sheet are not filled, If the OMR sheet is mutilated, torn, white Ink used, the circles filled and scratched, then the OMR sheet will not be graded**

All the best!!

Useful Data

At. Wt.:

$N = 14;\ O = 16;\ H = 1;\ S = 32;\ Cl = 35.5;\ Mn = 55;\ Na = 23;\ C = 12;\ Ag = 108;\ K = 39;\ Fe = 56;\ Pb = 207$

Physical Constants:

$h = 6.626 \times 10^{-34}\,\text{Js},\ \text{N}_\text{a} = 6.022 \times 10^{23}\,\text{mol}^{-1},\ \text{c} = 2.998 \times 10^{8}\,\text{m s}^{-1},\ \text{m}_\text{e} = 9.1 \times 10^{-31}\,\text{kg},\ R = 8.314\ \text{J mol}^{-1}\ \text{K}^{-1}$

Chemistry

Multiple Choice Questions with one correct answer. A correct answer carries 1 mark. No negative mark. **60 x 1 = 60**

1. A phosphorus oxide has 43.6% phosphorus (at, mass = 31).
   The empirical formula is
   (a) P_2O_5 (b) P_2O_3 (c) P_4O_6 (d) PO_2

2. Which of the following orbital designations is not correct corresponding to quantum number?
   (a) $n=5 \quad \ell=2 \quad \rightarrow 5d$ (b) $n=2 \quad \ell=0 \quad \rightarrow 2s$
   (c) $n=4 \quad \ell=3 \quad \rightarrow 4f$ (d) $n=7 \quad \ell=2 \quad \rightarrow 7d$

3. Which of the following families have largest negative electron gain enthalpy values?
   (a) Alkali metals (b) Noble gases
   (c) Halogens (d) Alkaline earth metals

4. The molecule/ion having pyramidal shape is
   (a) PCl_3 (b) SO_3 (c) CO_3^{2-} (d) NH_4^+

5. Identify a molecule which doesn't exist.
   (a) C_2 (b) O_2 (c) He_2 (d) Li_2

6. Density of 3M solution of $NaCl$ is 1.25 g/ml. The mass of the solvent in the solution is
   (a) 1075.4 g (b) 10.745 g (c) 10.754 g (d) 1074.5 g

7. A certain reaction is at equilibrium at 355k and the enthalpy change for the reaction is 213kJ. The value of $\Delta S \left(\text{in } Jk^{-1}mol^{-1}\right)$ for the reaction is
   (a) 55.0 (b) 60.0 (c) 68.5 (d) 120.0

8. $H_2(g)+I_2(g) \rightleftharpoons 2HI(g) \quad \Delta H=12.40\,kcal$
   According to the reaction, heat of formation of HI will be
   (a) 12.4 kcal (b) −12.4 kcal (c) −6.20 kcal (d) 6.20 kcal

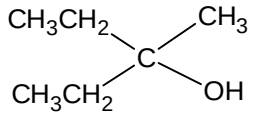
9. The ratio of K_p / K_c for the reaction $CO(g)+\frac{1}{2}O_2(g) \rightleftharpoons CO_2(g)$ is
   (a) 1 (b) RT (c) $(RT)^{\frac{1}{2}}$ (d) $(RT)^{-\frac{1}{2}}$

10. Which of the following are Lewis acids?
    (a) PH_3 and BCl_3 (b) $AlCl_3$ and $SiCl_4$ (c) PH_3 and $SiCl_4$ (d) BCl_3 and $AlCl_3$

11. In the ionic equation for the reaction $IO_3^- + 6H^+ + ae^{-1} \rightarrow I^- + 3H_2O$ the value of a is
    (a) 2 (b) 4 (c) 6 (d) 10

12. Which of the following will given white precipitate on heating with $AgNO_3$?
    (a) $CHCl_3$ (b) CCl_4 (c) C_6H_5Cl (d) $NaCl$

13. The correct nomenclature (IUPAC) for the following alcohol is



(a) 2-Ethylbutan-2-ol (b) 3-methyl pentan3-ol

(c) 3-Ehtyl-3-methyl ethanol (d) 1, 1 – diethylmethanol

14. In terms of relative stability, which of the following is in general wrong

(a) tertiary free radicals are more stable than secondary

(b) secondary free radicals are more staple than primary

(c) tertiary carbocation is less stable than secondary

(d) secondary carbocation is less stable than primary

15. Ethylene reacts with alkaline $KMnO_4$ to give

(a) Acetaldehyde (b) Ethylene glycol (c) Formaldehyde (d) Ethylene oxide

16. According to Huckel rate the aromatic compounds must have delocalised Π electrons equal to

(a) $(4n+1)$ (b) $(4n+2)$ (c) $4n$ (d) $(2n+2)$

17. Ozonolysis of an organic compound $'A'$ produces acetone and propionaldehyde in equimolar mixture. Identify $'A'$ from thr following compunds.

(a) Pent $-1-$ ene (b) $2-$Methylpent $-1-$ ene

(c) 2 Methylpent $-2-$ ene (d) $2-$Methylpent $-1-$ ene

18. The complex $\left[Ag(NH_3)_2\right]\left[Ag(CN)_2\right]$ has the IUPAC name

(a) diamminesilver (I) dicyanosilver (I) (b) diammine silver (I) dicyanoargentate (I)

(c) dicyanosilver (I) diammineargentate (I) (d) diamminesilver (I) dicyanoargentate (II)

19. The half-life period of a 1st order reaction is 60 minutes. What percentage will be left over after 240 minutes?

(a) 5% (b) 6.25% (c) 6% (d) 4.25%

20. 18 g of glucose $(C_6H_{12}O_6)$ is added to 178.2 g of water. The vapour pressure of water for this aqueous solution at $100°C$ is

(a) 76.00 torr (b) 752.40 torr (c) 759.00 torr (d) 7.60 torr

21. The ratio of the value of any colligative property for $CaCl_2$ solution to that of sugar solution under equal concentration is nearly

(a) 1.0 (b) 0.33 (c) 3.0 (d) 2.5

22. The freezing point of a solution containing $36g$ of a compound having empirical formula CH_2O in $1200g$ of water is found to be $-0.93°$. Molecular formula of the compound is $\left(\text{Kf} = 1.86K\ \text{kg mol}^{-1}\right)$

(a) CH_2O (b) $C_2H_4O_2$ (c) $C_3H_6O_3$ (d) $C_4H_8O_2$

23. All form ideal solution except

(a) C_6H_6 and $C_6H_5CH_3$ (b) C_2H_5Br and C_2H_5I

(c) C_6H_5Cl and C_6H_5Br (d) C_2H_5I and C_2H_5OH

24. The electrode potential of a silver electrode dipped in a 0.01M solution of silver nitrate at 25°C $\left(E^{\circ}_{Ag^{+}/Ag} = 0.80\text{V}\right)$

(a) 0.0741V (b) 0.059V (c) 0.741V (d) 0.859V

25. In $H_2 - O_2$ fuel cell, the reaction occurring at cathode is

(a) $H^{+} + OH^{-1} \rightarrow H_2O(l)$ (b) $H^{+} + e^{-1} \rightarrow \frac{1}{2}H_2$

(c) $O_2 + 2H_2O + 4e^{-1} \rightarrow 4OH^{-1}$ (d) $2H_2 + O_2 \rightarrow 2H_2O(l)$

26. If $\wedge_C$ for NH_4OH is $11.5\Omega^{-1}\,\text{cm}^{-2}\,\text{mol}^{-1}$, its degree of dissociation would be (given that $\lambda^{\circ}_{NH_4^{+}} = 73.4$ and $\lambda^{\circ}_{OH^{-}} = 197.6\Omega^{-1}\,\text{cm}^2\,\text{mol}^{-1}$)

(a) 0.0848 (b) 0.0424 (c) 0.0212 (d) 0.004

27. How many hours does it take to reduce 1mol of Fe^{3+} to Fe^{2+} with $2A$ current?

(a) 35 (b) 20.0 (c) 26.8 (d) 13.4

28. For the reaction: $3ClO^{-} \rightarrow 3Cl0_3^{-} + 2Cl^{-}$ various steps are

$Cl0^{-} + Cl0^{-} \rightarrow Cl0_2^{-} + Cl^{-}$ (slow)

$ClO_2^{-} + ClO^{-} \rightarrow ClO_3^{-} + Cl^{-}$ (fast)

The order of the reaction is

(a) 1 (b) 2 (c) 0 (d) $\frac{3}{2}$

29. If the half-life period for a reaction in A is 100mins. How long will it take $[A]$ to reach 25% of its initial concentration?

(a) 50 min (b) 250 min (c) 200 min (d) 500 min

30. A reaction having equal energies of activation for forward and reverse reactions has

(a) $\Delta G = 0$ (b) $\Delta H = 0$ (c) $\Delta H = \Delta G = \Delta S = 0$ (d) $\Delta S = 0$

31. A reaction has rate law expression as

$\text{Rate} = k[A]^{3/2}[B]^{-1/2}$

If concentration of both A and B are increased four times, the rate of the reaction

(a) increases 4 times (b) decreases 4 times (c) increases 16 times (d) remains same

32. The inversion of cane sugar into glucose and fructose is a reaction of

(a) first order (b) second order (c) third order (d) zero order

33. The rate equation for the reaction $2NO + Cl_2 \longrightarrow 2NOCl$ is given by the rate equation $r = K[NO]^2[Cl_2]$.

The value of rate constant can be increased by

(a) increasing the temperature (b) increasing the concentration of NO

(c) increasing the concentration of Cl_2 (d) doing all these

34. Which of the following electrolytic solutions has the least specific conductance?

(a) $2\,N$ (b) $0.002\,N$ (c) $0.02N$ (d) $0.2\,\mathrm{N}$

35. Cell constant of a cell is generally found using

(a) $NaCl$ (b) KCl (c) NH_4Cl (d) H_2SO_4

36. Question:

Electrolyte	KCl	KNO_3	HCl	$NaOAc$	$NaCl$
$\wedge^{\circ}\left(\mathrm{S\ cm^2 mol^{-1}}\right)$	149.9	145.0	426.2	91.0	126.5

Calculate $\overset{\circ}{\wedge}_{HOAC}$ using appropriate molar conductance of the electrolytes listed above at infinite dilution in H_2O at $25°C$

(a) 517.2 (b) 552.7 (c) 390.7 (d) 217.5

37. Nickel carbonyl is having

(a) linear structure (b) tetrahedral structure

(c) square planar structure (d) octahedral structure

38. According to crystal field theory, the $M-L$ bond in a complex is

(a) purely ionic (b) purely covalent (c) purely co-ordinate (d) partially covalent

39. Which of the following hybridisation has planar geometry?

(a) sp^3d (b) dsp^3 (c) dsp^2 (d) sp^3

40. Which of the following forms a colourless solution in aqueous solution?

(a) v^{3+} (b) Cr^{3+} (c) Ti^{3+} (d) Sc^{3+}

41. The electronic configuration of Cr^{3+} is

(a) $[Ar]3d^3 4s°$ (b) $[Ar]3d^4 4s^2$ (c) $[Ar]3d^5 4s^1$ (d) $[Ar]3d^2 4s^1$

42. The correct order of the first ionisation enthalpies is

(a) $Mn < Ti < Zn < Ni$ (b) $Ti < Mn < Zn < Ni$

(c) $Ti < Mn < Ni < Zn$ (d) $Zn < Ni < Mn < Ti$

43. Which of the following is most acidic?

(a) MnO_3 (b) MnO_2 (c) Mn_2O_7 (d) Mn_3O_4

44. Which of the following is least basic?

(a) $La(OH)_3$ (b) $Lu(OH)_3$ (c) $Ce(OH)_3$ (d) $Nd(OH)_3$

45. Which of the following has maximum conductivity in aqueous solution?

(a) $Co(NH_3)_4Cl_3$ (b) $Co(NH_3)_3Cl_3$ (c) $Co(NH_3)_5Cl_3$ (d) $Co(NH_3)_6Cl_3$

46. Which of the following compounds show optical isomerism?

(a) $\left[Cu(NH_3)_4\right]^{2+}$ (b) $[ZnCl_4]^{2-}$ (c) $\left[Cr(C_2O_4)_3\right]^{3-}$ (d) $\left[Cr(CN)_6\right]^{3-}$

47. Ethyl bromide can be obtained by the action of HBr on

(a) Ethyne (b) Ethane (c) Propene (d) Ethanol

48. S_N1 mechanism of alkyl halide is favoured by

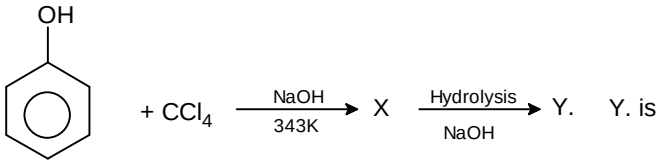
(a) Higher concentration of nucleophile (b) Polar solvents

(c) Presence of less bulky alkyl group (d) Strong nucleophiles

49. Which of the following is most acidic?

(a) CH_3CH_2OH (b) $(CH_3)_2CHOH$ (c) $(CH_3)CHCH_2OH$ (d) CH_3OH

50. In the reaction



Y. is

(a) Salicylaldehyde (b) Salicylic acid (c) $O-$Cresol (d) Benzoic acid

51. The major product in the reaction

$CH_3-O-CH(CH_3)_2+HI \rightarrow$ Product

(a) $ICH-O-CH(CH_3)_2$ (b) $CH_3-O-\underset{\underset{I}{|}}{C}-(CH_3)_2$

(c) $CH_3I+(CH_3)_2CHOH$ (d) $CH_3OH+(CH_3)_2CHI$

52. Which of the following is most reactive towards HCN ?

(a) CH_3COCH_3 (b) CH_3CHO (c) $CH_3COC_2H_5$ (d) $HCHO$

53. Which of the following will give cannizzaro reaction?

(a) CH_3CHO (b) CH_3COCH_3 (c) $(CH_3)_3C-CHO$ (d) $(CH_3)_2CHCHO$

54. In the reaction

$CH_3CH_2COOH \xrightarrow{P,Cl_2} X \xrightarrow{alc\,KOH} Y.$ Y is

(a) $CH_2=CH-COOH$ (b) $CH_3CH_2CH_2OH$ (c) CH_3-CH_2-CHO (d) $CH_3-\underset{\underset{OH}{|}}{CH}-COOH$

55. Mononitration of aniline is achieved by

(a) direct treatment with nitration mixture under reflux

(b) using fuming HNO_3

(c) acetylation followed by nitration and subsequent hydrolysis

(d) $KNO_3+con.\ HNO_3$

56. Structurally cellulose is a linear polymers of

(a) $\beta-$ glucose molecules

(b) Sucrose molecules

(c) $\alpha-$ glucose molecules

(d) Fructose molecules

57. A peptide harmone is

(a) Estrone (b) Testosterone (c) Insulin (d) Corticoid

58. Which of the following statement is not correct about DNA molecule?

(a) It has double helix structure

(b) It serves as hereditary material

(c) The two DNA strands are exactly similar

(d) Its replication is called semi-conservative mode of replication

59. The order of reactivities of methyl halides in the formation of Grignard reagent is

(a) $CH_3Br > CH_3Cl > CH_3I$ (b) $CH_3Br > CH_3I > CH_3Cl$

(c) $CH_3I > CH_3Br > CH_3Cl$ (d) $CH_3Cl > CH_3Br > CH_3I$

60. Tollen's reagent is

(a) Alkaline $KMnO_4$ solution (b) Sodium potassium tartarate & $NaOH$

(c) Ammonical $AgNO_3$ solution (d) Ammonical Cu_2Cl_2

Mathematics

Multiple Choice Questions with one correct answer. A correct answer carries 1 mark. No negative mark. 60 x 1 = 60

61. The value of $\cos^2 15° - \cos^2 30° + \cos^2 45° - \cos^2 60° + \cos^2 75°$ is

(a) 2 (b) 0 (c) $\frac{1}{4}$ (d) $\frac{1}{2}$

62. $\sin 10° + \sin 20° + \sin 30° + ... + \sin 360°$ is equal to

(a) 0 (b) 1 (c) -1 (d) none of these

63. If α is a root of $25\cos^2\theta + 5\cos\theta - 12 = 0$, $\frac{\pi}{2} < \alpha < \pi$, then $\sin 2\alpha$ is equal to

(a) $\frac{24}{25}$ (b) $\frac{-24}{25}$ (c) $\frac{25}{24}$ (d) none of these

64. The solution set of the inequation $\left(x^2 + x + 1\right)(2x - 3) > 0$ is

(a) R (b) $\left(\frac{3}{2}, \infty\right)$ (c) $\left[\frac{3}{2}, \infty\right)$ (d) $\left(-\infty, \frac{3}{2}\right)$

65. If $1 + 6 + 11 + ... + x = 148$, then x is equal to

(a) 36 (b) 8 (c) 30 (d) None of these

66. The figures $4, 5, 6, 7, 8$ are written in every possible order. The number of numbers greater than 56000 is

(a) 72 (b) 90 (c) 96 (d) 98

67. The mean and S.D of $1, 2, 3, 4, 5, 6$ is

(a) $\frac{7}{2}, \sqrt{\frac{35}{12}}$ (b) $3, 3$ (c) $\frac{7}{2}, \sqrt{3}$ (d) $3, \frac{35}{12}$

68. A digit is selected at random from either of the two sets $\{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ and $\{1, 2, 3, 4, 5, 6, 7, 8, 9\}$. What is the chance that the sum of the digits selected is 10 ?

(a) $\frac{1}{9}$ (b) $\frac{10}{81}$ (c) $\frac{10}{18}$ (d) None of these

69. A baised dice is tossed and the respective probabilities of various faces to show up are

Face	1	2	3	4	5	6
Probability	0.1	0.24	0.19	0.18	0.15	0.14

If an even face has turned up, then the probability that it is face 2 or face 4 is

(a) 0.42 (b) 0.75 (c) 0.25 (d) 0.33

70. Four cards are drawn simultaneously from a deck of 52 cards. The chance that they all are the same suit is

(a) $\frac{C(13,4)}{C(52,4)}$ (b) $\frac{4C(13,4)}{C(52,4)}$ (c) $\frac{4!C(13,4)}{C(52,4)}$ (d) None of these

71. The probability that an event E occurs in one trial of an experiment is 0.4. Three independent trials of experiment are performed. The probability that the event E occurs atleast once is

(a) 0.784 (b) 0.904 (c) 0.936 (d) none of these

72. A bag 'A' contains two white and two red balls and another bag 'B' contains 4 white and 5 red balls. A ball is drawn and is found to be red. The probability that is was drawn from bag B is

(a) $\frac{25}{52}$ (b) $\frac{1}{2}$ (c) $\frac{10}{19}$ (d) $\frac{13}{18}$

73. If $P(A\cap B)=\frac{1}{2}$ and $P(A'\cap B')=\frac{1}{3}$, $P(A)=p$ and $P(B)=2p$ then value of p is

(a) $\frac{7}{18}$ (b) $\frac{1}{3}$ (c) $\frac{4}{9}$ (d) $\frac{1}{9}$

74. The range of the function $f(x)=a\sin x+b\cos x$ is

(a) $[a,b]$ (b) $[a-b,a+b]$ (c) $[-(a+b),(a+b)]$ (d) $\left[-\sqrt{a^2+b^2},\sqrt{a^2+b^2}\right]$

75. The function $f(x)=x^2+\sin x$ is

(a) an odd function (b) an even function
(c) neither even nor odd (d) a constant function

76. Let $f:[0,\infty)\to[0,2]$ be defined by $f(x)=\frac{2x}{1+x}$, then f is

(a) one-one, but not onto (b) onto, but not one-one
(c) both one-one onto (d) neither one-one nor onto

77. If $f(x)=\frac{x-1}{x+1}$, then $f\left(\frac{1}{f(x)}\right)$ equals

(a) 0 (b) 1 (c) x (d) $\frac{1}{x}$

78. The projection of the vector $\hat{i}-2\hat{j}+\hat{k}$ on the vector $4\hat{i}-4\hat{j}+7\hat{k}$ is

(a) $\frac{5}{19}\sqrt{5}$ (b) $\frac{19}{9}$ (c) $\frac{9}{19}$ (d) $\frac{1}{19}\sqrt{6}$

79. If $\vec{a}+\vec{b}$ is at right angles to $\vec{b}$ and $2\vec{b}+\vec{a}$ is at right angles to $\vec{a}$ then

(a) $a=\sqrt{2}b$ (b) $a=2b$ (c) $a=b$ (d) $2a=b$

80. The lines $\frac{x-1}{2}=\frac{y-2}{3}=\frac{z-3}{4}$ and $\frac{x-1}{3}=\frac{y-2}{4}=\frac{z-3}{5}$ are

(a) skew (b) parallel (c) intersecting (d) none of these

81. If $f(x)=(1-x)\tan\frac{\pi x}{2}$, then $\lim_{x\to 1} f(x)$ is equal to

(a) $\frac{\pi}{2}$ (b) $\frac{2}{\pi}$ (c) 0 (d) 1

82. $\lim_{n\to\infty}\left(\frac{1}{1\cdot 2}+\frac{1}{2\cdot 3}+\frac{1}{3\cdot 4}+.....+\frac{1}{n(n+1)}\right)=$

(a) -1 (b) 1 (c) 0 (d) none of these

83. $\lim_{x\to 4}\frac{3-\sqrt{5+x}}{1-\sqrt{5-x}}=$

(a) 0 (b) $\frac{1}{3}$ (c) $-\frac{1}{3}$ (d) does not exist

84. If $y=\frac{\log x}{x}$, then $\frac{d^2y}{dx^2}=$

(a) $\frac{3-2\log x}{x^3}$ (b) $\frac{2\log x-3}{x^3}$ (c) $\frac{2\log x-3}{x^4}$ (d) None of these

85. Let $f(x)=\frac{x^2}{1-x^2}$, $x\neq 0,\pm 1$. Then derivative of $f(x)$ w.r.t x^2 is

(a) $\frac{2x}{\left(1-x^2\right)^2}$ (b) $\frac{1}{\left(1-x^2\right)^2}$ (c) $\frac{1}{\left(2+x^2\right)^2}$ (d) $\frac{1}{\left(2-x^2\right)^2}$

86. If $y=\log\left(\sqrt{x}+\sqrt{x-a}\right)$, then $\frac{dy}{dx}$ is equal to

(a) $\frac{1}{\sqrt{x}+\sqrt{x-a}}$ (b) $\frac{1}{2\sqrt{x}\sqrt{x-a}}$ (c) $\frac{1}{\sqrt{x}\sqrt{x-a}}$ (d) none of these

87. Differential co-efficient of $\sec\left(\tan^{-1}x\right)$ is

(a) $\frac{x}{\sqrt{1+x^2}}$ (b) $\frac{1}{\sqrt{1+x^2}}$ (c) $x\sqrt{1+x^2}$ (d) $\frac{x}{1+x^2}$

88. Let $f(x)=\frac{1-\sin x}{(\pi-2x)^2}$ when $x\neq\frac{\pi}{2}$ and $f\left(\frac{\pi}{2}\right)=k$. The value of k which makes f continuous at $\frac{\pi}{2}$ is

(a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) $\frac{1}{8}$ (d) none of these

89. Let $f(x)=\begin{cases}a+x, x\geq 0\\ a-x, x<0\end{cases}$, then $f(x)$ is

(a) continuous but not derivable at 0 (b) derivable at 0

(c) not continuous at 0 (d) none of these

90. Let $f(x)=x^{25}(1-x)^{75}$ for all $x\in[0,1]$, then $f(x)$ assumes its maximum value at

(a) 0 (b) $\frac{1}{4}$ (c) $\frac{1}{2}$ (d) $\frac{1}{3}$

91. Let $f(x)=\tan x-4x$, then in the interval $\left(-\frac{\pi}{3},\frac{\pi}{3}\right)$, $f(x)$ is

(a) a decreasing function (b) an increasing function

(c) a constant function (d) none of these

92. The maximum value of $f=4x+3y$ subject to constraints $x\geq 0,\ y\geq 0,\ 2x+3y\leq 18,\ x+y\geq 10$ is

(a) 35 (b) 36 (c) 34 (d) none of these

93. If A and B are any two sets, then $(A\cup B)-(A\cap B)$ is equal to

(a) $A-B$ (b) $B-A$ (c) $(A-B)\cup(B-A)$ (d) None of these

94. $\int\frac{\cos 2x}{\cos x}dx=$

(a) $2\sin x+\log(\sec x+\tan x)+C$ (b) $2\sin x+\log(\sec x-\tan x)+C$

(c) $2\sin x-\log|\sec x+\tan x|+C$ (d) $2\sin x-\log|\sec x-\tan x|+C$

95. An anti-derivative of $\frac{x}{\cos^2 x}$ is

(a) $x\tan x+C$ (b) $\log|\cos x|+C$ (c) $x\tan x+\log|\cos x|+C$ (d) $\cot x+C$

96. $\int\frac{1}{\sqrt{1-x}}dx$ is equal to

(a) $\sqrt{1-x}+C$ (b) $-2\sqrt{1-x}+C$ (c) $2\sqrt{1-x}+C$ (d) none of these

97. $\int\frac{\log x-1}{(\log x)^2}dx$ is equal to

(a) $\frac{\log x}{x}+c$ (b) $\frac{x}{\log x}+c$ (c) $\frac{(\log x)^2-x}{\log x}$ (d) none of these

98. $\int\frac{1}{x^3\left(x^3+1\right)^{1/3}}dx$ is equal to

(a) $-\frac{1}{2}\left(1+x^{-3}\right)^{2/3}+C$ (b) $-\left(1+x^3\right)^{2/3}+C$ (c) $-\left(1+x^{-3}\right)^{-2/3}+C$ (d) none of these

99. The value of $\int_1^2\frac{1}{x^2}e^{-1/x}dx$ is

(a) $\frac{1}{\sqrt{e}}+\frac{1}{e}$ (b) $\frac{1}{e}-\frac{1}{\sqrt{e}}$ (c) $\frac{1}{\sqrt{e}}-\frac{1}{e}$ (d) 0

100. $\int_{-8}^{8}\left(\sin^{93}x+x^{295}\right)dx$ is equal to

(a) 0 (b) a number different from 0

(c) $2\left(8^{295}+1\right)$ (d) $2+8^{295}$

101. $\int_{0}^{2}\frac{dx}{\left\{ax+b(2-x)\right\}^{2}}$ is equal to

(a) $\frac{-1}{2ab}$ (b) $\frac{1}{2ab}$ (c) $\frac{\alpha-b}{2ab}$ (d) none of these

102. If $\int_{0}^{\pi/2}\frac{\cos x}{4-\sin^{2}x}dx=\lambda\log 3$, then λ is equal to

(a) $\frac{1}{4}$ (b) $-\frac{1}{4}$ (c) $\frac{1}{2}$ (d) none of these

103. The solution of the differential equation $\cos x\sin ydx+\sin x\cos ydy=0$ is

(a) $\frac{\sin x}{\sin y}=C$ (b) $\cos x+\cos y=C$ (c) $\sin x+\sin y=C$ (d) $\sin x\sin y=C$

104. If $\cos\left(2\sin^{-1}x\right)=\frac{1}{9}$ then $x=$

(a) $\frac{2}{3}$ (b) $\frac{-2}{3}$ (c) $\pm\frac{2}{3}$ (d) none of these

105. If A and B are symmetric matrices of the same order, then

(a) AB is a symmetric matrix (b) AB is skew-symmetric matrix

(c) $AB+BA$ is symmetric matrix (d) $AB-BA$ is a symmetric matrix

106. If the system of equations $x+ky-z=0$, $3x-ky-z=0$ and $x-3y+z=0$, has non-zero solution, then k is equal to

(a) -1 (b) 0 (c) 1 (d) 2

107. Let P and Q be 3×3 matrices, $P\neq Q$. If $P^3=Q^3$ and $P^2Q=Q^2P$, then determinant of $\left(P^2+Q^2\right)$ is equal to

(a) -2 (b) 1 (c) 0 (d) -1

108. If $A=\begin{bmatrix}a&0&0\\0&a&0\\0&0&a\end{bmatrix}$, then $|A||adj\,A|$ is equal to

(a) a^9 (b) a^{-3} (c) $-a^7$ (d) $2a^6$

109. A straight line passes through the points $(5,0)$ and $(0,3)$. The length of perpendicular from the point $(4,4)$ on the line is

(a) $\frac{15}{\sqrt{34}}$ (b) $\frac{\sqrt{17}}{2}$ (c) $\frac{17}{2}$ (d) $\sqrt{\frac{17}{2}}$

110. The principal value of $\sin^{-1}\left[\sin\left(\frac{2\pi}{3}\right)\right]$ is

(a) $\frac{-2\pi}{3}$ (b) $\frac{2\pi}{3}$ (c) $\frac{4\pi}{3}$ (d) None of these

111. If $\sin^{-1}x+\sin^{-1}y+\sin^{-1}z=\frac{3\pi}{2}$, then the value of $x^9+y^9+z^9-\frac{1}{x^9y^9z^9}$ is

(a) 0 (b) 1 (c) 2 (d) 3

112. Equation of the line passing through $(2,-1,1)$ and parallel to the line $\frac{x-5}{4}=\frac{y+2}{-3}=\frac{z}{5}$ is

(a) $\frac{x-2}{4}=\frac{y+1}{-3}=\frac{z-1}{5}$ (b) $\frac{x-2}{4}=\frac{y+1}{3}=\frac{z-1}{5}$

(c) $\frac{x-2}{-4}=\frac{y+1}{-3}=\frac{z-1}{5}$ (d) None of these

113. The angle between the lines $\frac{x+4}{1}=\frac{y-3}{2}=\frac{z+2}{3}$ and $\frac{x}{3}=\frac{y-1}{-2}=\frac{z}{1}$ is

(a) $\sin^{-1}\left(\frac{1}{7}\right)$ (b) $\cos^{-1}\left(\frac{2}{7}\right)$ (c) $\cos^{-1}\left(\frac{1}{7}\right)$ (d) None of these

114. A sphere increases its volume at the rate of $\pi\,cm^3/s$. The rate at which its surface area increases, when the radius is $1cm$ is

(a) 2π sq cm/s (b) π sq cm/s (c) $\frac{3\pi}{2}$ sq cm/s (d) $\frac{\pi}{2}$ sq cm/s

115. The area enclosed by $y=3x-5, y=0, x=3$ and $x=5$ is

(a) 12 sq units (b) 13 sq units (c) $13\frac{1}{2}$ sq units (d) 14 sq units

116. The solution of the differential equation $\frac{dy}{dx}=y\tan x-2\sin x$, is

(a) $y\sin x=C+\sin 2x$ (b) $y\cos x=C+\frac{1}{2}\sin 2x$

(c) $y\cos x=C-\sin 2x$ (d) $y\cos x=C+\frac{1}{2}\cos 2x$

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

(a) 20 (b) 9 (c) $\frac{5}{4}$ (d) $\frac{4}{5}$

118. The sum of the coefficients in the expansion of $\left(1+x-3x^2\right)^{3148}$ is

(a) 8 (b) 7 (c) 1 (d) -1

119. If sum of the series $\sum_{n=0}^{\infty} r^n = S$ for $|r| < 1$, then sum of the series $\sum_{n=0}^{\infty} r^{2n}$, is

(a) S^2 (b) $\frac{S^2}{2S+1}$ (c) $\frac{2S}{S^2-1}$ (d) $\frac{S^2}{2S-1}$

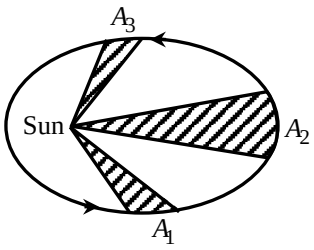
120. The equation of the ellipse whose foci are $(\pm 2, 0)$ and eccentricity $1/2$, is

(a) $\frac{x^2}{12}+\frac{y^2}{16}=1$ (b) $\frac{x^2}{16}+\frac{y^2}{12}=1$ (c) $\frac{x^2}{16}+\frac{y^2}{8}=1$ (d) None of these

Physics

Multiple Choice Questions with one correct answer. A correct answer carries 1 mark. No negative mark. 60 x 1 = 60

121. A planet moving around sun sweeps area A_1 in 2 days, A_2 in 3 days and A_3 in 6 days. Then the relation between A_1, A_2 and A_3 is



(a) $3A_1 = 2A_2 = A_3$ (b) $2A_1 = 3A_2 = 6A_3$ (c) $3A_1 = 2A_2 = 6A_3$ (d) $6A_1 = 3A_2 = 2A_3$

122. Identical springs of steel and copper $(Y_{steel} > Y_{copper})$ are equally stretched. Then

(a) Less work is done on copper spring (b) Less work is done on steel spring

(c) Equal work is done on both the springs (d) Data is incomplete

123. A solid sphere is rotating in free space. If the radius of sphere is increased keeping mass same which one of the following will not be affected?

(a) Angular velocity (b) Angular momentum

(c) Moment of inertia (d) Rotational kinetic energy

124. Streamline flow is more likely for liquids with

(a) High density and low viscosity

(b) Low density and high viscosity

(c) High density and high viscosity

(d) Low density and low viscosity

125. $0.1\ m^3$ of water at $80°C$ is mixed with $0.3 m^3$ of water at $60°C$. The final temperature of the mixture is

(a) $65°C$ (b) $70°C$ (c) $60°C$ (d) $75°C$

126. The velocity of the molecules of a gas at temperature $120\,K$ is v. At what temperature will the velocity be $2v$?

(a) $120\,K$ (b) $240\,K$ (c) $480\,K$ (d) $1120\,K$

127. One mole of an ideal monoatomic gas is heated at a constant pressure of one atmosphere from $0°C$ to $100°C$. Then the change in the internal energy is

(a) 6.56 joules (b) 8.32×10^2 joules (c) 12.48×10^2 joules (d) 20.80 joules

128. A particle is executing a simple harmonic motion of amplitude a. Its potential energy is maximum when the displacement from the position of the maximum kinetic energy is

(a) 0 (b) $\pm a$ (c) $+\frac{a}{2}$ (d) $-\frac{a}{2}$

129. Three sound waves of equal amplitudes have frequencies $(n-1), n, (n+1)$. They superimpose to give beats. The number of beats produced per second will be

(a) 1 (b) 4 (c) 3 (d) 2

130. Two charges are at a distance d apart. If a copper plate of thickness $\frac{d}{2}$ is kept between them, then effective force will be

(a) $\frac{F}{2}$ (b) $\sqrt{2}F$ (c) $2F$ (d) Zero

131. The electric field due to an extremely short dipole at distance r from it is proportional to

(a) $\frac{1}{r}$ (b) $\frac{1}{r^2}$ (c) $\frac{1}{r^3}$ (d) $\frac{1}{r^4}$

132. A hollow conducting sphere of radius R has a charge $(+Q)$ on its surface. What is the electric potential within the sphere at a distance $r=\frac{R}{3}$ from its centre

(a) Zero (b) $\frac{3}{4\pi\varepsilon_0}\frac{Q}{R}$ (c) $\frac{1}{4\pi\varepsilon_0}\frac{Q}{R}$ (d) $\frac{1}{4\pi\varepsilon_0}\frac{Q}{R^2}$

133. An infinite number of charges, each of charge $1\mu C$, are placed on the $x-$axis with coordinates $x=1,2,4,8,...\infty$ (in m). If a charge of $1C$ is kept at the origin, then what is the net force acting on $1C$ charge?

(a) 9000 N (b) 12000 N (c) 24000 N (d) 36000 N

134. A particle A has a charge q and particle B has charge $+4q$ with each of them having the mass m, when allowed to fall from rest through same potential difference. The ratio of their speeds $v_A : v_B$ will be

(a) 4:1 (b) 1:4 (c) 1:2 (d) 2:1

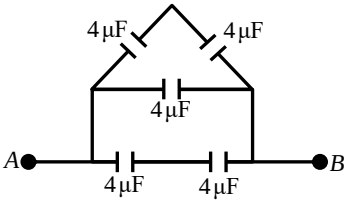
135. Equivalent capacitance between A and B is

(a) $8\mu F$

(b) $6\mu F$

(c) $26\mu F$

(d) $\frac{10}{3}\mu F$



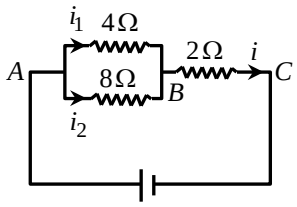
136. A cube of side $'b'$ has a charge q at each of its vertices. The electric field at the centre of the cube is

(a) $\frac{4q}{3\pi\varepsilon_0 b^2}$ (b) $\frac{3q}{4\pi\varepsilon_0 b^2}$ (c) $\frac{2q}{\pi\varepsilon_0 b^2}$ (d) Zero

137. Two small similar metal spheres A and B having charges $4q$ and $-4q$, when placed at a certain distance apart, exert an electric force F on each other. When another identical uncharged sphere C, first touched with A then with B and then removed to infinity, the force of interaction between A and B for the same separation will be

(a) $\frac{F}{2}$ (b) $\frac{F}{8}$ (c) $\frac{F}{16}$ (d) $\frac{F}{32}$

138. In the circuit shows in figure, the current in 4Ω resistance is $1.2\,\text{A}$. What is the potential difference between B and C?



(a) 3.6 volt (b) 6.3 volt (c) 1.8 volt (d) 2.4 volt

139. When no current is passed through a conductor,

(a) The free electrons do not move

(b) The average speed of a free electron over a large period of time is not zero

(c) The average velocity of a free electron over a large period of time is zero

(d) The average of the velocities of all the free electrons at an instant is non-zero

140. A piece of copper and another of germanium are cooled from room temperature to $50\,\text{K}$. The resistance of

(a) Each of them decreases

(b) Copper decreases and germanium increases

(c) Each of them increases

(d) Copper increases and germanium decreases

141. A metal wire is subjected to a constant potential difference. When the temperature of the metal wire increases, the drift velocity of the electron in it

(a) Increases, thermal velocity of the electron increases

(b) decreases, thermal velocity of the electron increases

(c) Increases, thermal velocity of the electron decreases

(d) Decreases, thermal velocity of the electron decreases

142. The unit of specific resistance is

(a) $\Omega\,\text{m}$ (b) $\Omega^{-1}\text{m}^{-1}$ (c) Ω^{-1} (d) $\Omega\,\text{m}^{-1}$

143. A cell of internal resistance r is connected across an external resistance nr. Then the ration of the terminal voltage to the emf of the cell is

(a) $\frac{1}{n}$ (b) $\frac{1}{n+1}$ (c) $\frac{n}{n+1}$ (d) $\frac{n-1}{n}$

144. Two identical wires A and B, each of length $'l'$, carry the same current I. Wire A is bent into a circle of radius R and wire B is bent to form a square of side $'a'$. If B_A and B_B are the values of magnetic field at the centres of the circle and square respectively, then the ratio $\frac{B_A}{B_B}$ is

(a) $\frac{\pi^2}{16}$ (b) $\frac{\pi^2}{8\sqrt{2}}$ (c) $\frac{\pi^2}{8}$ (d) $\frac{\pi^2}{16\sqrt{2}}$

145. A moving coil galvanometer has N number of turns in a coil of effective area A, it carries a current I. The magnetic field B is radial. The torque acting on the coil is

(a) NA^2B^2I (b) $NABI^2$ (c) N^2ABI (d) $NABI$

146. The distance between the wires of electric mains is $12\,\text{cm}$. These wires experience $4\,\text{mg wt}$ per unit length. The value of current flowing in each wire will be

(a) $4.85\,\text{A}$ (b) 0 (c) $4.85\times10^{-2}\,\text{A}$ (d) $4.85\times10^{-4}\,\text{A}$

147. A ring of radius R, made of an insulating material carries a charge Q uniformly distributed on it. If the ring rotates about the axis passing through its centre and normal to plane of the ring with constant angular speed ω, then the magnitude of the magnetic moment of the ring is

(a) $Q\omega R^2$ (b) $\frac{1}{2}Q\omega R^2$ (c) $Q\omega^2R$ (d) $\frac{1}{2}Q\omega^2R$

148. The horizontal component of the Earth's magnetic field is 3.6×10^{-5} tesla where the dip angle is $60°$. The magnitude of the Earth's magnetic field is

(a) 2.8×10^{-4} tesla (b) 2.1×10^{-4} tesla (c) 7.2×10^{-5} tesla (d) 3.6×10^{-5} tesla

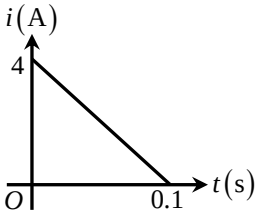
149. A deuteron of kinetic energy $50\,\text{keV}$ is describing a circular orbit of radius 0.5 metre in a plane perpendicular to the magnetic field B. The kinetic energy of the proton that describes a circular orbit of radius 0.5 metre in the same plane with the same B is

(a) $25\,\text{keV}$ (b) $50\,\text{keV}$ (c) $200\,\text{keV}$ (d) $100\,\text{keV}$

150. Susceptibility is positive and large for a

(a) paramagnetic substance (b) ferromagnetic substance
(c) diamagnetic substance (d) non magnetic substance

151. In a coil of resistance $10\,\Omega$, the induced current developed by changing magnetic flux through it, is shown in figure as a function of time. The magnitude of change in flux through the coil in weber is



(a) 8 (b) 2
(c) 6 (d) 4

152. Two coils have a mutual inductance $0.005\,\text{H}$. The current changes in the first coil according to equation $I = I_0\sin\omega t$, where $I_0 = 10\,\text{A}$ and $\omega = 100\pi\,\text{rad s}^{-1}$. The maximum value of e.m.f. in the second coil is

(a) 2π (b) 5π (c) π (d) 4π

153. A coil has resistance 30 ohm and inductive reactance 20 ohm at $50\,\text{Hz}$ frequency. If an ac source, of 200 volt, $100\,\text{Hz}$, is connected across the coil, the current in the coil will be

(a) $4.0\,\text{A}$ (b) $8.0\,\text{A}$ (c) $\frac{20}{\sqrt{13}}\,\text{A}$ (d) $2.0\,\text{A}$

154. In an AC circuit the voltage applied is $E = E_0 \sin \omega t$. The resulting current in the circuit is $I = I_0 \sin\left(\omega t - \frac{\pi}{2}\right)$. The power consumption in the circuit is given by

(a) $P = \sqrt{2} E_0 I_0$ (b) $P = \frac{E_0 I_0}{\sqrt{2}}$ (c) $P = \text{zero}$ (d) $P = \frac{E_0 I_0}{2}$

155. An AC voltage is applied to a resistance R and an inductor L in series. If R and the inductive reactance are both equal to 3Ω, the phase difference between the applied voltage and the current in the circuit is

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{2}$ (d) Zero

156. The electromagnetic waves

(a) Travel with the speed of sound
(b) Travel with the same speed in all media
(c) Travel in free space with the speed of light
(d) Do not travel through a medium

157. A ray of light passes through an equilateral prism such that the angle of incidence is equal to the angle of emergence and the latter is equal to $\frac{3}{4}$th of angle of prism. The angle of deviation is

(a) $25°$ (b) $30°$ (c) $45°$ (d) $35°$

158. The magnifying power of a telescope is 9. When it is adjusted for parallel rays the distance between the objective and eyepiece is $20\,\text{cm}$. The focal length of lenses are

(a) $10\,\text{cm}$, 10 cm (b) $15\,\text{cm}$, $5\,\text{cm}$ (c) $18\,\text{cm}$, $2\,\text{cm}$ (d) $11\,\text{cm}$, $9\,\text{cm}$

159. Identify the wrong sign convention.

(a) The magnification for virtual image formed by a convex lens is positive
(b) The magnification for real image formed by a convex lens is negative
(c) The height measured normal to the principal axis upwards is positive
(d) The magnification for virtual image formed by a concave lens is negative

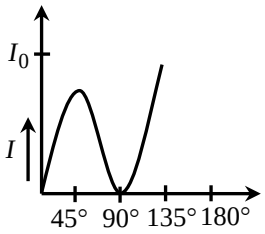
160. When plane face of plano-convex lens is silvered, it behaves as a concave mirror of focal length $30\,\text{cm}$. But when its curved surface is silvered, it behaves as a concave mirror of focal length $10\,\text{cm}$. The refractive index of lens material is

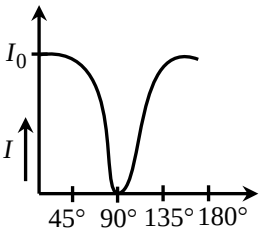
(a) 1.25 (b) 1.33 (c) 1.732 (d) 1.5

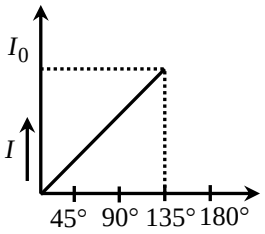
161. Huygens's concept of secondary wave

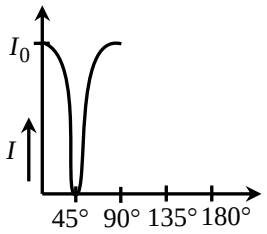
(a) Allows us to find the focal length of a thick lens
(b) Is a geometrical method to find a wave front
(c) Is used to determine the velocity of light
(d) Is used to explain polarisation

162. The graph showing the dependence of intensity of transmitted light on the angle between polariser and analyser, is

(a) 

(b) 

(c) 

(d) 

163. Cathode ray consists of

(a) Photons (b) Electrons (c) Protons (d) $\alpha-$particles

164. Photoelectric emission is observed from a metallic surface for frequencies v_1 and v_2 of the incident light rays $(v_1 > v_2)$. If the maximum values of kinetic energy of the photoelectrons emitted in two cases are in the ratio of $1:k$, then the threshold frequency of the metallic surface is

(a) $\frac{v_1 - v_2}{k-1}$ (b) $\frac{kv_1 - v_2}{k-1}$ (c) $\frac{kv_2 - v_1}{k-1}$ (d) $\frac{v_2 - v_1}{k}$

165. Rutherford's atomic model was unstable because

(a) Nuclei will break down (b) Electrons do not remain in orbit

(c) Orbiting electrons radiate energy (d) Electrons are repelled by the nucleus

166. According to Bohr's model of hydrogen atom

(a) The linear velocity of the electron is quantised.

(b) The angular velocity of the electron is quantised.

(c) The linear momentum of the electrons is quantised.

(d) The angular momentum of the electron is quantised.

167. As per Bohr model, the minimum energy (in eV) required to remove an electron from the ground state of doubly ionized Li atom $(Z = 3)$ is

(a) 1.51 (b) 13.6 (c) 40.8 (d) 122.4

168. The radius of a nucleus is

(a) Directly proportional to its mass number

(b) Inversely proportional to its atomic weight

(c) Directly proportional to the cube root of its mass number

(d) None of these

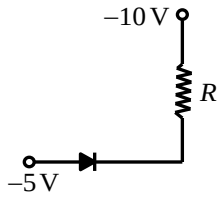
169. Nuclear force exists between

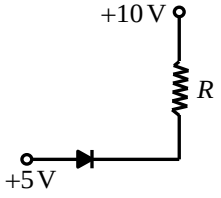
(a) Neutron-neutron (b) Proton-proton (c) Neutron-proton (d) all of these

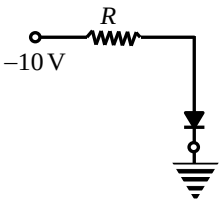
170. The mass of a $^{7}_{3}Li$ nucleus is $0.042\,u$ less than the sum of masses of all its nucleons. The binding energy per nucleon of $^{7}_{3}Li$ nucleus is nearly

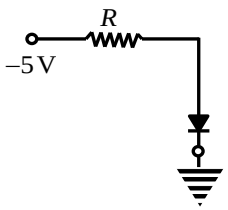
(a) 46 MeV (b) 5.6 MeV (c) 3.9 MeV (d) 23 MeV

171. Which of the junction diodes shown below are forward biased?

(a)


(b)


(c)


(d)


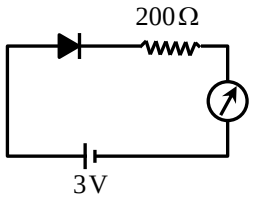
172. If the ratio of the concentration of electrons to that of holes in a semiconductor is $\frac{7}{5}$ and the ratio of currents is $\frac{7}{4}$, then what is the ratio of their drift velocities?

(a) $\frac{5}{8}$ (b) $\frac{4}{5}$ (c) $\frac{5}{4}$ (d) $\frac{4}{7}$

173. The reading of the ammeter for a silicon diode in the given circuit is

(a) 0 (b) 15 mA

(c) 11.5 mA (d) 13.5 mA



174. Two straight long conductors AOB and COD are perpendicular to each other and carry currents i_1 and i_2. The magnitude of the magnetic field at a point P at a distance a from the point O in a direction perpendicular to the plane $ABCD$ is

(a) $\frac{\mu_0}{2\pi a}(i_1+i_2)$ (b) $\frac{\mu_0}{2\pi a}(i_1-i_2)$ (c) $\frac{\mu_0}{2\pi a}\left(i_1^2+i_2^2\right)^{1/2}$ (d) $\frac{\mu_0}{2\pi a}\frac{i_1 i_2}{(i_1+i_2)}$

175. The velocity v of a particle at time t is given by $v = at + \frac{b}{t+c}$, where a, b and c are constant. The dimensions of a, b and c are respectively

(a) $\left[L^2\right], [T]$ and $\left[LT^2\right]$ (b) $\left[LT^2\right], [LT]$ and $[L]$

(c) $[L], [LT]$ and $\left[T^2\right]$ (d) $\left[LT^{-2}\right], [L]$ and $[T]$

176. A ball is dropped from a bridge at a height of $176.4\,m$ over a river. After $2\,s$, a second ball is thrown straight downwards. What should be the initial velocity of the second ball so that both hit the water simultaneously?

(a) $2.45\,ms^{-1}$ (b) $49\,ms^{-1}$ (c) $14.5\,ms^{-1}$ (d) $24.5\,ms^{-1}$

177. If the relation between the range R and time of flight T of a projectile is given as $R = 5T^2$, the value of angle of projection is

(a) $45°$ (b) $15°$ (c) $60°$ (d) $90°$

178. A body of mass $10\,kg$ is acted upon by two perpendicular forces, $6\,N$ and $8\,N$. The resultant acceleration of the body is

(a) $1\,ms^{-2}$ at an angle of $\tan^{-1}\left(\frac{3}{4}\right)$ w.r.t. $8\,N$ force

(b) $0.2\,ms^{-2}$ at an angle of $\tan^{-1}\left(\frac{3}{4}\right)$ w.r.t. $8\,N$ force

(c) $1\,ms^{-2}$ at an angle of $\tan^{-1}\left(\frac{4}{3}\right)$ w.r.t. $8\,N$ force

(d) $0.2\,ms^{-2}$ at an angle of $\tan^{-1}\left(\frac{4}{3}\right)$ w.r.t. $8\,N$ force

179. Which one of the following statement is true?

(a) Momentum is conserved in elastic collisions but not in inelastic collisions

(b) Total kinetic energy is conserved in elastic collisions but momentum is not conserved in elastic collisions

(c) Total kinetic energy is not conserved but momentum is conserved in inelastic collisions

(d) Kinetic energy and momentum both are conserved in all types of collisions

180. According to the principle of conservation of angular momentum, if moment of inertia of a rotating body decreases, then its angular velocity

(a) Decreases (b) Increases (c) Remains constant (d) Becomes zero