MODEL PAPER - 6

PHYSICS

81. The theory of relativity was given by ***(Physical world)***
1) J.J Thomson 2) Faraday 3) Einstein 4) Chadwick

82. The equation of alternating current $I = I_0 e^{-t/CR}$, where t is time, C is capacitance and R is resistance of coil, then the dimensions of CR is ***(Units and Mesurement)***
1) $[MLT^{-1}]$ 2) $[M^0LT]$ 3) $[M^0L^0T]$ 4) $[M^0L^0T^0]$

83. An electron starting from rest has a velocity that increases linearly with the time that is v = kt, where $k= 2m/sec^2$. The distance travelled in the first 3 seconds will be ***(Motion in a Straight Line)***
1) 9 m 2) 16 m 3) 27 m 4) 36 m

84. A particle projected from the level of the ground just clears in its ascent a wall 30m high and $120\sqrt{3}$ m away measured horizontally. The time from projection to clearing the wall is two seconds. How far from the wall does it strike the ground on the other side of the wall if the level of the ground is the same on both sides of the wall? ***(Motion in a Plane)***
1) $150\sqrt{3}$ m 2) $180\sqrt{3}$ m 3) $120\sqrt{3}$ m 4) $210\sqrt{3}$ m

85. The range of a projectile, when launched at an angleof $22\frac{1}{2}^0$ with the horiontal is 5 km. The additional horizontal distance the projectile would cover when projected with same velocity at 30^0 is ***(Motion in a Plane)***
1) $5\left(\frac{\sqrt{3}}{2}-1\right)$ 2) $5\left(\sqrt{\frac{3}{2}}-1\right)$ 3) $5\sqrt{\frac{3}{2}}$ 4) $5\left[\sqrt{\frac{3}{2}}+1\right]$

86. A space craft of mass 2000 kg moving wit a velocity of 600 m/s suddenly explodes into two pieces. One piece of mass 500 kg is left stationary. The velocity of the other part must be ***(Law of Motion)***
1) 600 m/s 2) 800 m/s 3) 1500 m/s 4) 1000 m/s

87. A person weighing 60 kg in a small boat of mass 140 kg that is at rest, throws a 5 kg stone in the horizontal direction with a velocity of 14 ms^{-1}. The velocity of the boat immediately after the throw is ***(Law of Motion)***
1) 1.2 ms^{-1} 2) 0.5 ms^{-1} 3) 0.35 ms^{-1} 4) 0.65 ms^{-1}

88. A box of mas 50 kg at rest is pulled up on an inclined plane 12m long and 2m high by a constant force of 100 N. When it reaches the top of the inclined plane if its velocity is 2 ms^{-1}, the work done against friction is Joules is ($g = 10\ ms^{-2}$) ***(Work, Energy, Power)***
1) 50 2) 100 3) 150 4) 200

89. Two idential cylindrical vessels each of area of cross-section A are on a level ground. Each contains a liquid of density 'ρ'. The heights of liquid columns are h_1 and h_2. If the two vessels are connected by means of a narrow pipe at the bottom, the work done by gravity in equalizing the liquid levels is ***(Work, Energy, Power)***
1) $\frac{A\rho g(h_1-h_2)^2}{2}$ 2) $\frac{A\rho g}{2}(h_1^2-h_2^2)$ 3) $\frac{A\rho g}{4}(h_1^2-h_2^2)$ 4) $\frac{A\rho g}{4}(h_1-h_2)^2$

90. A vehicle is travelling along concave road then along convex road of same radius of curvatures at uniform speed. If the normal reactions on the vehicle as it crosses the lowest point of concave surface, highest point of convex surface are 1.5×10^4 N, 3×10^3 N respectively, the mass of vehicle is ($g = 10\ m/s^{-2}$) ***(System of Particles and RM)***
1) 400 kg 2) 450 kg 3) 800 kg 4) 900 kg

91. The bob of a simple pendulum at rest position is given minimum velocity in horizontal direction so that it describes vertical circle of radius equal to length of simple pendulum. If velocity of the bob at the highest point is V, then velocity is at an angular displacement 60^0 from lowest point is ***(System of Particles and RM)***
1) $\sqrt{2}$ V 2) $\sqrt{3}$ V 3) 2 V 4) 3 V

92. The bob of a simple pendulum at rest position is given a velocity V in horizontal direction so that the bob describes vertical circle of radius equal to length of pendulum ℓ. If the tension in string is 4 times weight of bob when the string is horizontal, the velocityof bob when it is crossing highest pointof vertical circle is ***(System of Particles and RM)***
1) $\sqrt{\frac{g\ell}{2}}$ 2) $\sqrt{g\ell}$ 3) $\sqrt{\frac{3g\ell}{2}}$ 4) $\sqrt{2g\ell}$

93. A point of mass m is suspended at the end of a massless wire of length ℓ and cross section A. if Y is the Young's modulus for the wire, the frequency of oscillation along the vertical line is ***(Oscillation)***
1) $\frac{1}{2\pi}\sqrt{\frac{YA}{m\ell}}$ 2) $2\pi\sqrt{\frac{YA\ell}{m}}$ 3) $2\pi\sqrt{\frac{\ell}{YAm}}$ 4) $\frac{1}{2\pi}\sqrt{\frac{m\ell}{YA}}$

94. The radius of a planet is R. A satellite revolves around it in a circle of radius r with angular speed ω. The acceleration due to gravity on planet's surface will be *(Gravitation)*

1) $\frac{r^3\omega}{R}$ 2) $\frac{r^2\omega^3}{R}$ 3) $\frac{r^3\omega^2}{R^2}$ 4) $\frac{r^2\omega^2}{R}$

95. If a bar is made of copper whose co-efficient of linear expansion is one and a half times that of Iron, the ratiio of the force developed in the copper bar to the iron bar of identical lengths and cross sections, when heated through the same temperature change (Young's modulus for copper may be taken to be equal to that of Iron) is *(Mechanical Properties of Solids)*

1) 3/2 2) 2/3 3) 9/4 4) 4/9

96. Water flows in a streamline manner through a capillary tube of radius a, the pressure difference being P and the rate of flow Q. If the radius is reduced to a/2 and the pressure is increased to 2P, the rae of flow becomes *(Mechanical Properties of Fluids)*

1) Q/8 2) Q/5 3) Q/4 4) Q/3

97. The rate of radiation from a black body at 0^0C is E. The rate fo radiation from this black body at 273^0C is *(Thermal Properties of Matter)*

1) 2 E 2) E/2 3) 16E 4) E/16

98. Two identical balls 'A' and 'B' are moving with same velocity. If velocity of 'A' is reduced to half and of 'B' to zero, then the rise in temperature of 'A' to that of 'B' is *(Thermodynamics)*

1) 3 : 4 2) 4 : 1 3) 2 : 1 4) 1 : 1

99. For a gas $\gamma = \frac{5}{3}$, 800 c.c of this gas is suddenly compressed to 100 c.c. If the initial pressure is P, then the final pressure will be *(Thermodynamics)*

1) $\frac{P}{32}$ 2) $\frac{2p}{5}$ 3) 8 P 4) 32 P

100. During an adiabatic process, the pressure of a gas is found to be proportional to the cube of its absolute temperature. The ration $\frac{C_P}{C_V} = \gamma$ for the gas is *(Kinetic Theory of gases)*

1) 2 2) 3/2 3) 5/3 4) 4/3

101. To an observer, the pitch of a stationery source of sound appears to be reduced by 20%. If the speed of sound is 340m/s then speed and direction of the observer is *(Waves)*

1) 86 m/s towards the source 2) 68 m/s towards the source
3) 86 m/s away from the source 4) 68 m/s away from the source

102. A ray of light passes through an equilateral glass prism, such that the angle of incidence is equal to the angle of emergence. If the angle of emergence is 3/4 times the angle of prism. The refractive index of the glass prism. *(Ray Optics and Optical Instruments)*

1) $\sqrt{7}$ 2) $\sqrt{2}$ 3) $\sqrt{5}$ 4) $\sqrt{3}/2$

103. There is a prism with refractive index equal to $\sqrt{2}$ and the refracting angle equal to 30^0. One of the refracting surfaces of the prism is polished. A beam of monochromatic light will retrace its path if its angle of incidence over the refracting surface of the prism is *(Ray Optics and Optical Instruments)*

1) 0^0 2) 30^0 3) 45^0 4) 60^0

104. In young's double slit experiment interference is produced due to slits distance d metre apart. The fringe pattern is observed on a screen distant D metre from the slits. If λ in metre, denotes, the wavelength of light, the number of fringes per metre on the screen is : *(Wave Optics)*

1) $\frac{\lambda D}{d}$ 2) $\frac{\lambda d}{D}$ 3) $\frac{d}{\lambda D}$ 4) $\frac{D}{\lambda d}$

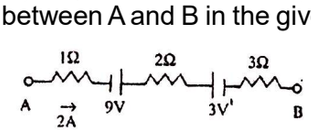
105. The breakdown electric intensity for air is 3 x10^6 V/m. The maximum charge that can be held by a sphere of radius 1 mm is *(Electric Charges and Fields)*

1) 0.33 C 2) 0.33 nC 3) 3.3 C 4) 3.3 μ C

106. A parallel plate capacitor with air as medium between the plates has a capacitance of 10 μ F. The area of the capcitor is divided into two equal halves and filled with two media having dielectric constant $K_1 = 2$ and $K_2 = 4$. The capacitance will now be. *(Electrostatic Potential and Capacitance)*

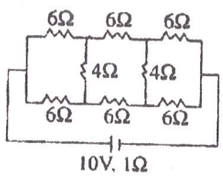
1) 10 μ F 2) 20 μ F 3) 30 μ F 40 μ F

107. The potential difference between A and B in the given branch of a circuit is *(Current Electricity)*



1) 6V 2) 12 V 3) 9 V 4) 0 V

108. Current in the main circuit shown is *(Current Electricity)*



1) 1.5 A 2) 2 A 3) 0.6 A 4) 1 A

109. A porton, a deuteron and an α - particle are accelerated through same potential difference and then they enter a normal uniform magnetic field, the ratio of their kinetic energies will be *(Moving Charges and Magnetism)*

1) 2 : 1 : 3 2) 1 : 1: 2 3) 1 : 1: 1 4) 1 : 2: 4

110. A beam of protons enters a uniform magnetic field of 0.3 T with a velocity of 4×10^5 m/sec in a direction making an angle of 60^0 with the direction of magnetic field. The path of motion of the particle will be *(Moving Charges and Magnetism)*

1) Circular 2) Straight line 3) Parabolic 4) helical

111. When two magnetic poles one of which is four times greater than the other in pole strength, are placed 5 cm apart in air. They exert a mutual force of 144 mg. wt. On each other. The pole strengths of the poles are (in amper metre) ($g = 10\ m/s^2$). *(Magnetism and Matter)*

1) 6, 3 2) 9,3 3) 12, 3 4) 18, 6

112. An inductor of 12 mH and a resistor of 4 $K\Omega$ are connected in series across a battery of 240 V through a switch. After closig the switch the current in the circuit starts growing. When the currents is 15 mA, the potential differences across the indicator will be *(Electromagnetic Induction)*

1) 60V 2) 120 V 3) 180 V 4) 240 V

113. The equation of an alternating voltage is $E = 220 \sin(\omega t + \pi / 6)$ and the equation of the current in the circuit is $I = 10 \sin(\omega t - \pi / 6)$ Then the impedance of the circuit is *(Alternating Current)*

1) 10 ohm 2) 22 ohm 3) 11 ohm 4) 17 ohm

114. In an apparatus, The electric field was found to oscillate with amplitude of 18 V/m. The amplitude of the oscillating magnetic field will be *(Electromagnetic Waves)*

1) 4×10^{-6} T 2) 6×10^{-8} T 3) 9×10^{-8} T 4) 11×10^{-11} T

115. Ultraviolet light of wavelength 300 nm and intensity 1.0 W/m^2 falls on the surface of a photoelectric material. If one percent of the incident photons produce photoelectrons, Then the number of photoelectrons emitted from an area of 1.0 cm^2 of the surface is nearly *(Dual Nature)*

1) 9.61×10^{14} per second 2) 4.12×10^{13} per second
3) 1.51×10^{12} per second 4) 2.13×10^{11} per second

116. An α - particle passes through a potential difference of 2×10^6 volt and then it becomes incident on a silver foil. The charge number of silver is 47. The energy of incident particles will be (in joules). *(Atoms)*

1) 5×10^{-12} 2) 6.4×10^{-13} 3) 5.8×10^{-14} 4) 9.1×10^{-15}

117. α and β- particles emitted when uranium nucleus $_{92}U^{238}$ decay to $_{82}Pb^{214}$ are *(Nuclei)*

1) 6 - α particle and 2 - β particles 2) 4 α - particles and 2 β particles
3) 2 - α particles and 6 β particles 4) 2 α - particles and 4 β - particles

118. In a transistor circuit the base current changes from 30 μA to 90 μ A. If the current gain of transistor is 30, the change in the collector current is *(Semiconductors)*

1) 4 m A 2) 2 m A 3) 3.6 m A 4) 1.8 m A

119. The Boolean expression for the gate circuit shown in below figure is *(Semiconductors)*

1) A. 1 = A 2) $A.\overline{A} = 0$ 3) A. A = A 4) A.0 = 0

120. The maximum peak - to- peak voltage of an AM wave is 16 mV and the minimum peak - to- peak voltage is 4 mV. The modulation factor is equal to *(Communication System)*

1) 0.6 2) 0.3 3) 0.8 4) 0.25