MODEL PAPER - 2
PHYSICS

81. What is the principle involved in the working of Rocket? ***(Physical world)***
1) Newton laws of motion 2) Bernoulli's principle
3) Photoelectric effect 4) Faraday's laws of EMI

82. The percentage errors in the measurement of mass and speed are 2% and 3% respectively. How much will be the maximum error in the estimate of the kinetic energy obtained by measuring mass and speed? ***(Units and Mesurement)***
1) 11% 2) 8% 3) 5% 4) 1%

83. The distance travelled by a falling body in the last second of its motion, to that in the last but one second is 7 : 5, the velocity with which body strikes the ground is ***(Motion in a Straight Line)***
1) 19.6 m/s 2) 39.2 m/s 3) 29.4 m/s 4) 49 m/s

84. The top of two mountains of heights 120 m and 100.4m are separated by a distance of 16m. The minimum velocity of zeep to reach from the top of first mountain to second mountain is ***(Motion in a Plane)***
1) 2 ms^{-1} 2) 5 ms^{-1} 3) 8 ms^{-1} 4) 9 ms^{-1}

85. A particle is projected with velocity 28m/s and at an angle 60^0 to the horizontal so that it just clears two walls of equal height 20m which are a distance 40m from each other. The time interval for which the particle travels between this two walls is ***(Motion in a Plane)***
1) $\frac{20}{7}$s 2) $\frac{10\sqrt{2}}{7}$s 3) $\frac{10}{7}$s 4) $\frac{5\sqrt{2}}{7}$s

86. A block of metal weighing 2 kg is resting on a frictionless plane. It is struck by a jet releasing water at a rate of 1 kgs^{-1} and at a speed of 5 ms^{-1}. The initial acceleraiton of the block will be ***(Law of Motion)***
1) 2.5 ms^{-2} 2) 5.0 ms^{-2} 3) 10 ms^{-2} 4) 10^3 kmh^{-2}

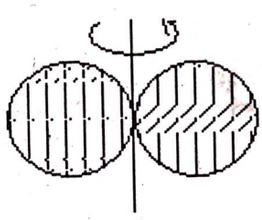
87. Water coming out of a hose pipe strikes a wall normally with a velocity 40m/s and then trikles down the wall. If the area of cross-section of the pipe 1cm^2, force acting on the wall is ***(Law of Motion)***
1) 80 N 2) 160 N 3) 40 N 4) 120 N

88. 800 kW power is supplied to a motor of 70% efficiency. This motor is in turn connected to a crane, whose efficiency is also 70%. If this crane lifts a 20 ton rock, its velocity is ***(Work, Energy, Power)***
1) 2 ms^{-1} 2) 0.2 ms^{-1} 3) 20 ms^{-1} 4) 10 ms^{-1}

89. A car weighing 500 kg climbs up a hill of slope 1 in 49 with a velocity of 36 KMPH. If the frictional force is 50N, the pwer delivered by the engine is ***(Work, Energy, Power)***
1) 500 W 2) 5 kW 3) 1.5 kW 4) 150 W

90. A thin rod of mass M and length L is bent into a circular ring. The expression for moment of inertia of ring about an axis passing through its diameter is ***(System of Particles and RM)***
1) $\frac{ML^2}{2\pi^2}$ 2) $\frac{ML^2}{4\pi^2}$ 3) $\frac{ML^2}{8\pi^2}$ 4) $\frac{ML^2}{\pi^2}$

91. Two identical circular plates each of mass 0.1 kg and radius 10 cm are joined side by side as shown in the figure. Their moment of inertia about an axis passing through their common tangent is ***(System of Particles and RM)***

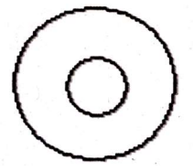


1) 1.25 x $10^{-3}$$kgm^2$ 2) 2.5 x $10^{-3}$$kgm^2$ 3) 1.25 x 10^{-2} kgm^2 4) 2.5 x 10^{-2} kgm^2

92. Moment of inertia of a thin circular plate of mass M, radius R about an axis passing through its diameter is I. The moment of inertia of a circular ring of mass M, radius R about an axis perpendicular to its plane and passing through its centre is ***(System of Particles and RM)***
1) 2I 2) $\frac{I}{2}$ 3) 4I 4) $\frac{I}{4}$

93. A force of 6.4 N stretches a vertical spring by 0.1 m. The mass that must be suspended from the spring so that it oscillates with a period of $\left(\pi/4\right)$ seconds. ***(Oscillation)***
1) $\left(\pi/4\right)$ kg 2) 1 kg 3) $\left(1/\pi\right)$ kg 4) 10 kg

94. The potential, energy of the shown system (mass of both the shells is m and internal and outer radius is r & 2r) is
(Gravitation)



1) $\frac{-5Gm^2}{4r}$ 2) $-\frac{3Gm^2}{4r}$ 3) $-\frac{7Gm^2}{4r}$ 4) None

95. A body of mass 10 kg is attached to the lower end of a wire of 3×10^{-1}m long and area of cross-section $10^{-6}m^2$. When it is rotated along the horizontal circular path find the maximum angular velocity if it has a breaking stress is 4.8×10^7 N/m^2 *(Mechanical Properties of Solids)*
1) 8 rad/sec 2) 4 rad/sec 3) 2 rad/sec 4) 1 rad/sec

96. Two capillary tubes AB and BC are joined end to end at B. AB is 16 cm long and of diameter 4 mm. BC is 4 cm long and of diameter 2 mm. The composite tube is held horizontally with end. A connected to a vessel of water giving a constant head of 3 cm and C is opened to air. Find the pressure difference between B and C
(Mechanical Properties of Fluids)
1) 2.4 cm of water 2) 1.2 cm of water 3) 4.8 cm of water 4) 3.2 cm of water

97. Two metallic spheres P and Q of the same surface finish are taken. Weight of P is twice that of Q. Both the spheres are heated to the same temperature and are left in a room to cool by radiation. The ratio of the rate of cooling of P to that of Q is *(Thermal Properties of Matter)*
1) $1:\sqrt{2}$ 2) $\sqrt{2}:1$ 3) $1:(2)^{1/3}$ 4) $2^{1/3}:1$

98. A diatomic gas is heated at constant pressure. the fraction of the heat energy is used to increase the internal energy is *(Thermodynamics)*
1) 3/5 2) 3/7 3) 5/7 4) 5/9

99. The triatomic gas is heated isothermally. What percentage of the heat energy is used to increase the internal energy *(Thermodynamics)*
1) 0% 2) 14% 3) 60% 4) 100%

100. The number of molecules of N_2 and O_2 in a vessel are same. If a fine hole is made in the vessel then which gas escape out more rapidly? *(Kinetic Theory of gases)*
1) N_2 2) O_2 3) Both 4) Sometime N_2 and sometimes O_2

101. A source and a detector move away from each other, each with a speed of 10 m/s with respect to ground with no wind. If the detector detects a frequency 1650 Hz of the sound coming from the source, what is the original frequency of the source. (Speed of sound = 340 m/s) *(Waves)*
1) 750 Hz 2) 1750 Hz 3) 2000 Hz 4) 1800 Hz

102. The person can see clearly objects between 15 and 100 cm from his eye.The range of vision if he wears close fitting spectacles having a power of 0.8 diopter is *(Ray Optics and Optical Instruments)*
1) 5 to 500 cm 2) 12 to 250 cm 3) 17 to 500 cm 4) 17 to 250 cm

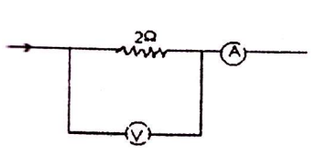
103. The near point of a person is 50 cm and the far point is 1.5m. The spectacles required for reading purpose and for seeing distant objects are respectively. *(Ray Optics and Optical Instruments)*
1) $+2D, -\left(\frac{2}{3}\right)D$ 2) $+\left(\frac{2}{3}\right)D, -2D$ 3) $-2D, +\left(\frac{2}{3}\right)D$ 4) $-\left(\frac{2}{3}\right)D, 2D$

104. In a young's double -slit experiment the widths of the two slits are not equal. The amplitudes of the waves are in the ratio 3:1 the ratio of the amplitude at the maxima and minima of interference is *(Wave Optics)*
1) 3 : 2 2) 2 : 3 3) 4 : 1 4) 1 : 4

105. The vertices of an equilateral traingle lie on the circumference of a circle of radius 6 cm. Changes each of 3C are placed at the vertices If a charge of 1C is placed at the centre of the circle, the force acting on it is
(Electric Charges and Fields)
1) 0.75×10^{13} N 2) 1.5×10^{13} N 3) 2.25×10^{13} N 4) Zero

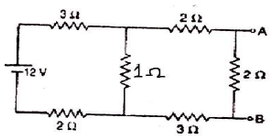
106. A parallel plate condenser has initially air medium between the plates. If a slab of dielectric constant 5 having thickness half the difference of separation between the plates is introduced, the percentage increase in its capacity is *(Electrostatic Potential and Capacitance)*
1) 33.3% 2) 66.7% 3) 50% 4) 75%

107. If the voltmeter reads 0.2 V and the ammeter reads 0.101 A, the resistance of the voltmeter is (in ohm)
(Current Electricity)



1) 500 2) 1000 3) 200 4) 400

108. The potential difference between the points A and B is *(Current Electricity)*



1) 1.50V 2) 2.50 V 3) 1.00V 4) 1.78V

109. A magnetic field $4 \times 10^{-3}\ \hat{k}$ T exerts a force $\left(4\hat{i}+3\hat{j}\right)x10^{-10}$N on a particle having a charge 10^{-9} C and going in the X-Y plane . The velocity of the particle is *(Moving Charges and Magnetism)*

1) $-75\hat{i}+100\hat{j}$ 2) $100\hat{i}+75\hat{j}$ 3) $75\hat{i}+100\hat{j}$ 4) $100\hat{i}-75\hat{j}$

110. A current of 5 amp flows downwards in along straight vertical conductor and the earth's horizontal flux density is 2×10^{-7} T then the neutral point is *(Moving Charges and Magnetism)*

1) due north 10m from the wire 2) due east 10m from the wire
3) due east 5m from the wire 4) due west 5 m from the wire

111. A magnetic needle of pole strength $20\sqrt{3}$ Am is pivoted at its centre. Its N - pole is pulled eastward by a string. The horizontal force required to produce a deflection of 30^0 from magnetic meridian (take $B_H = 10^{-4}$ T) is *(Magnetism and Matter)*

1) 4×10^{-3} N 2) 2×10^{-3} N 3) $\frac{2}{\sqrt{3}}x10^{-3}$N 4) $4\sqrt{3}x10^{-3}$N

112. The efficiency of a transformer is 98%. The primary voltage and current are 200 V and 6 A. If the secondary voltage is 100 V, the secondary current is *(Electromagnetic Induction)*

1)11.76 A 2) 12.25 A 3) 3.06 A 4) 2.94 A

113. The instantaneous value of emf and current in an A.C circuit are, $E = 1.414\sin\left(100\pi t - \frac{\pi}{4}\right)$, $I = 0.707\sin(100\pi t)$. The RMS value of emf will be *(Alternating Current)*

1) $2\sqrt{2}$V 2) 1V 3) $\frac{1}{2}$V 4) $\frac{1}{2\sqrt{2}}$V

114. Light with energy flux 36 w/cm² is incident on a well polished metal square plate of side 2 cm. The force experienced by it is *(Electromagnetic Waves)*

1) 0.96 μ N 2) 0.24 μ N 3) 0.12 μ N 4) 0.36 μ N

115. Work function of a metal is 2.1 eV. The pair of wavelengths which is able to emit photoelectrons is *(Dual Nature)*

1) 4000 A^0, 7500 A^0 2) 5500 A^0, 6000 A^0 3) 4000 A^0, 5000 A^0 4) 5500 A^0, 7500 A^0

116. The wavelength of first line of lyman series in hydrogen atom 1216 ^{0}A. The wavelength of first line of Lyman series for 10 times ionised sodium atom will be *(Atoms)*

1) 0.1 A^0 2) 1000 A^0 3) 100 A^0 4) 10 A^0

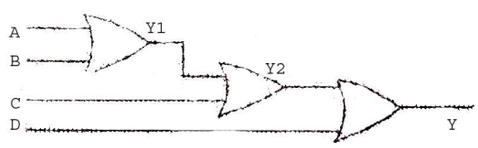
117. 10 grams of a radioactive element is disintegrated to 1 gram in 2.303 minutes. The half - life (in minutes) of that radioactive element is *(Nuclei)*

1) 1/0.693 2) 6.93 3) 1 4) 0.693

118. The current gain of transistor in a common emitter circuit is 40. The ratio of emitter current to base current is *(Semiconductors)*

1) 40 2) 41 3) 42 4) 43

119. The expression of Y in following circuit is *(Semiconductors)*



1) ABCD 2) A + BCD 3) A+B+C+D 4) AB+CD

120. A 600 W carrier is modulated to a deph of 75% by a 400 Hz sine wave.The total antenna power is *(Communication System)*

1) 769 W 2) 796 W 3) 679 W 4) 637.5 W