Mode Question Paper

Undergraduate Programme - Physics

Questions: 40
Time : 40 Minutes **Max. Marks: 40 x 1 = 40**

SHADE the correct Response viz., A, B, C, D or E in the RESPONSE SHEET. **Each question carry ONE mark.**

SAMPLE QUESTIONS

1) The dimensional formula for specific heat is
A) $M^1 L^2 T^{-2} K^1$
B) $M^1 L^2 T^{-2} K^{-1}$
C) $M^0 L^2 T^{-2}$
D) $M^0 L^1 T^{-2} K^{-1}$
E) $M^0 L^2 T^{-2} K^{-1}$

2) The moment of inertia of a circular disc of mass 200 g and radius 5 cm about a tangential axis normal to the plane of the disc is
A) 25×10^2 g cm^2
B) 50×10^2 g cm^2
C) 75×10^2 g cm^2
D) 100×10^2 g cm^2
E) 125×10^2 g cm^2

3) A particle kept fixed on a uniformly rotating turntable has a linear speed of 20 cm/s and linear acceleration of 20 cm/s^2. The particle is now shifted to a new position on the turntable so that its distance from the center is half of the original value. The new values of linear speed and linear acceleration will be
A) 10 cm/s, 10 cm/s^2
B) 20 cm/s, 20 cm/s^2
C) 20 cm/s, 40 cm/s^2
D) 40 cm/s, 10 cm/s^2
E) 40 cm/s, 40 cm/s^2

4) A uranium-238 nucleus, which is initially at rest, emits an alpha particle with a velocity of 1.5×10^7 m/s. Assuming that the mass of a nucleus is proportional to the mass number, the recoil velocity of the residual nucleus thorium-234 is
A) 2.56×10^5 m/s B) 1.28×10^5 m/s C) 0
D) -1.28×10^5 m/s E) -2.56×10^5 m/s

5) The acceleration due to gravity on the surface of the moon is 1/6th of that on the surface of the earth and the diameter of the moon is 1/4th of that of the earth. The ratio of the escape velocity from the earth to that from the moon is
A. $\sqrt{24}$ B) 3/2 C) 1 D) 2/3 E) $\frac{1}{\sqrt{24}}$

6) A wave is represented by the equation y = 0.001 mm sin[(50 s^{-1})t +(2.0 m^{-1})x]. If the wave is transverse, which of the following is false?
A) The frequency = 25/π Hz B) The wavelength = 3.14 m
C) The wave velocity = 100 m/s D) The amplitude = 0.001 mm
E) The initial phase of wave = 0°

7) The increase in length of a wire on stretching is 0.025%. If its Poisson's ratio is 0.4, then the % change in the diameter is __

A) 0.005% B) 0.01% C) 0.02%
D) 0.06% E) 0.16%

8) A beaker of circular cross section of radius 4 cm is filled with mercury upto a height of 10 cm. Find the pressure exerted at the bottom of the beaker. Atmospheric pressure = 10^5 N/m^2 and density of mercury = 13600 kg/m^3

A) 1.133 x 10^5 N/m^2 B) 1.33 x 10^4 N/m^2 C) 571 N/m^2
D) 502 N/m^2 E) 67 N/m^2

9) The temperature of a copper block of mass 500 g rises by 10°C) Given that the specific heat capacity of copper is 385 J K^{-1} kg^{-1}, the heat transferred is

A) 385 J B) 1.93 kJ C) 11.4 kJ
D) 54.5 kJ E) 1925 kJ

10) The direction of propagation of an electromagnetic wave is that of the vector

A) $\overline{E}$ B) $\overline{B}$ C) $\overline{E}.\overline{B}$ D) $\overline{E}\times\overline{B}$ E) $\overline{B}\times\overline{E}$

11) In a hydrogen atom an electron is revolving around the nucleus with an angular frequency of 6.28 rad per μs. The equivalent current is

A) 6.3 x 10^{-6} B) 1.6 x 10^{-13} C) 1.6 x 10^{-19} D) 1.0 x 10^{-24} E) 1.6 x 10^{-25}

12) The electrochemical equivalent of silver is 1.18 mg/C) How much silver in g is deposited by a current of 10 A in 5 minutes?

A) 0.059 B) 0.393 C) 0.708 D) 3.54 E) 3540

13) A 3 μF capacitor is charged to a potential of 100 V. The energy in the capacitor is

A) 6 x 10^{-4} J B) 1.5 x 10^{-2} J C) 3 x 10^{2} J D) 9 x 10^{2} J E) 15 x 10^{3} J

14) Two parallel conductors carrying current 5 A each, repel with a force per unit length of 0.25 N/m. The distance between them is

A) 3 x 10^{-2} m B) 2 x 10^{-2} m C) 3 x 10^{-5} m D) 2 x 10^{-5} m E) 1 x 10^{-5} m

15) In the nuclear reaction ${}_2He^4 + {}_ZX^A \rightarrow {}_{Z+2}Y^{A+3} + R$. The particle R is a/an

A) electron B) positron C) proton
D) neutron E) neutrino

….