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Physics mock test 8 2022-23

Time : 75 Min	Phy : Full Portion Paper	Marks : 200

01) Eight small drops, each of radius r and having same charge q are combined to form a big drop. The ratio between the potentials of the bigger drop and the smaller drop is
A) 1 : 8
B) 2 : 1
C) 4 : 1
D) 8 : 1

02) The wave velocity, if the radar gives 54 waves per min and wavelength of the given wave is 10 m will be ___
A) 5 m/s
B) 6 m/s
C) 9 m/s
D) 4 m/s

03) Two bodies of different masses m_a and m_b are dropped from two different heights a and b. The ratio of the time taken by the two to cover these distances are
A) $\sqrt{a} : \sqrt{b}$
B) a : b
C) b : a
D) $a^2 : b^2$

04) Sum of the two binary numbers $(1000010)_2$ and $(11011)_2$ is
A) $(111001)_2$
B) $(101111)_2$
C) $(111111)_2$
D) $(111101)_2$

05) A force of 6 N acts on a body at rest and of mass 1 kg. During this time, the body attains a velocity of 30 m/s. The time for which the force acts on the body is (1997)
A) 7 seconds
B) 5 seconds
C) 10 seconds
D) 8 seconds

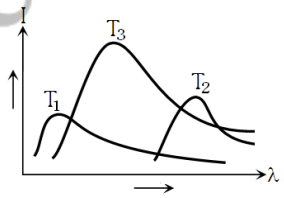
06) For a cell of e. m. f. 2 V, a balance is obtained for 50 cm of the potentiometer wire. If the cell is shunted by a $2\,\Omega$ resistor and the balance is obtained across 40 cm of the wire, then the internal resistance of the cell is
A) $1.00\,\Omega$
B) $0.80\,\Omega$
C) $0.50\,\Omega$
D) $0.25\,\Omega$

07) Tesla is a unit for measuring
A) magnetic induction.
B) magnetic moment.
C) magnetic intensity.
D) both (2) and (3).

08) In Young's double-slit experiment, an interference pattern is obtained on a screen by a light of wavelength 6000 Å, coming from the coherent sources S_1 and S_2. At certain point P on the screen third dark fringe is formed. Then the path difference $S_1P - S_2P$ in microns is
A) 4.5
B) 3.0
C) 1.5
D) 0.75

09) Which of the following is a necessary and sufficient condition for S. H. M.?
A) Constant period
B) Constant acceleration
C) Proportionality between acceleration and displacement from equilibrium position
D) Proportionality between restoring force and displacement from equilibrium position

10) The plots of intensity versus wavelength for three black bodies at temperatures T_1, T_2 and T_3 respectively are as shown below. Their temperature are such that



A) $T_3 > T_2 > T_1$
B) $T_2 > T_3 > T_1$
C) $T_1 > T_3 > T_2$
D) $T_1 > T_2 > T_3$

11) A lift is moving downwards with an acceleration equal to acceleration due to gravity. A body of mass m kept on the floor of the lift is pulled horizontally. If the coefficient of friction is μ, then the frictional resistance offered by the body is
A) $2\mu mg$
B) μmg
C) mg
D) Zero

12) A potentiometer wire is 100 cm long and a constant potential difference is maintained across it. Two cells are connected in series first to support one another and then in opposite direction. The balance points are obtained at 50 cm and 10 cm from the positive end of the wire in the two cases. The ratio of emf's is (2016)
A) 3 : 4
B) 3 : 2
C) 5 : 1

D) 5 : 4

13) If the radius of the earth decreases suddenly, then
A) the energy and angular momentum will remain constant.
B) the periodic time of the earth will increase.
C) the angular speed of the earth will increase.
D) the angular momentum of the earth will become greater than that of the sun.

14) The relative density of material of a body is found by weighing it first in air and then in water. The weight in air is (5.00 ± 0.05) Newton and weight in water is (4.00 ± 0.05) Newton. Find the relative density along with the maximum permissible percentage error?
A) 5.0 ± 1%
B) 1.25 ± 5%
C) 5.0 ± 8%
D) 5.0 ± 11%

15) A ray is incident at an angle of incidence i on one surface of a prism of small angle A and emerges normally from the opposite surface. If the refractive index of the material of the prism is μ, the angle of incidence i is nearly equal to
A) $\mu A / 2$
B) μA
C) $A / 2\mu$
D) A / μ

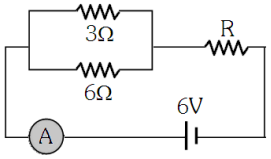
16) The capacitance of a parallel plate capacitor is $12\,\mu F$. If the distance between the plates is doubled and area is halved, then the new capacitance will be
A) $3\,\mu F$
B) $4\,\mu F$
C) $6\,\mu F$
D) $8\,\mu F$

17) A tuning fork A produces 4 beats/s with another tuning fork B of frequency 320 Hz. On filling the fork A, 4 beats/s are again heard. The frequency of fork A, after filling is
A) 314 Hz
B) 316 Hz
C) 320 Hz
D) 324 Hz

18) A body of mass m kg is lifted by a man to a height of one metre in 30 seconds. Another man lifts the same mass to the same height in 60 seconds. The work done by them are in the ratio
A) 1 : 2
B) 2 : 1
C) 1 : 1
D) 4 : 1

19) If the mass number of an atom is $A = 40$ and its electron configuration is $1s^2, 2s^2, 2p^6, 3s^2, 3p^6$, then the number of neutrons and protons in its nucleus will be
A) 18, 18
B) 20, 20
C) 18, 22
D) 22, 18

20) If the ammeter in the given circuit reads 2 A, the resistance R is



A) 4 ohm
B) 3 ohm
C) 2 ohm
D) 1 ohm

21) If the unit of force and length each be increased by four times, then the unit of energy is increased by
A) 2 times
B) 4 times
C) 8 times
D) 16 times

22) In the following reaction
$_{12}Mg^{24} +_2 He^4 \rightarrow_{14} Si^X +_0 n^1, X$ is
A) 22
B) 26
C) 27
D) 28

23) The ratio of angular speeds of minute hand and hour hand of a watch is
A) 1 : 12
B) 1 : 6
C) 6 : 1
D) 12 : 1

24) A $10\,\mu F$ capacitor and a $20\,\mu F$ capacitor are connected in series across a 200 V supply line. The charged capacitors are then disconnected from the line and reconnected with their positive plates together and negative plates together and no external voltage is applied. What is the potential difference across each capacitor?
A) 200 V
B) 400 V
C) $\frac{400}{9}$ V
D) $\frac{800}{9}$ V

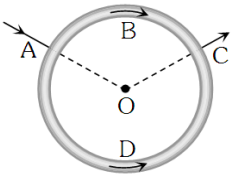
25) In a crystal, the atoms are located at the position of
A) minimum potential energy.
B) maximum potential energy.
C) zero potential energy.
D) infinite potential energy.

26) A plane electromagnetic wave is incident on a material surface. If the wave delivers momentum p and energy E, then
A) p = 0, E ≠ 0
B) p ≠ 0, E = 0
C) p ≠ 0, E ≠ 0
D) p = 0, E = 0

27) A small part of the rim of a fly wheel breaks off while it is rotating at a constant angular speed. Then its radius of gyration will
A) decrease.
B) increase.
C) remain unchanged.
D) nothing definite can be said.

28) A straight wire carrying current i is turned into a circular loop. If the magnitude of magnetic moment associated with it in M. K. S. unit is M, then the length of wire will be
A) $4\pi i M$
B) $\frac{M\pi}{4i}$
C) $\sqrt{\frac{4\pi M}{i}}$
D) $\sqrt{\frac{4\pi i}{M}}$

29) A uniform wire is bent in the form of a circle of radius R. A current I enters at A and leaves at C as shown in the figure. If the length ABC is half of the length ADC, the magnetic field at the center O will be



A) $\frac{\mu_0 I}{6R}$
B) $\frac{\mu_0 I}{4R}$
C) $\frac{\mu_0 I}{2R}$
D) Zero

30) An air bubble in a glass slab with refractive index 1.5 (near normal incidence) is 5 cm deep when viewed from one surface and 3 cm deep when viewed from the opposite face. The thickness (in cm) of the slab is (2016)
A) 8
B) 10
C) 12
D) 16

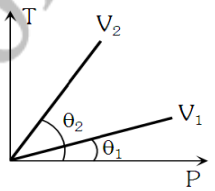
31) Air is filled in a motor tube at 27^oC and at a pressure of 8 atmospheres. The tube suddenly bursts, then temperature of air is [For air $\gamma = 1.5$]
A) 150^oC
B) 150 K
C) 75^o K
D) 27.5^oC

32) If 1 g of steam is mixed with 1 g of ice, then resultant temperature of the mixture is (1999)
A) 100^oC
B) 230^oC
C) 270^oC
D) 50^oC

33) In a circuit L, C and R are connected in series with an alternating voltage source of frequency f. The current leads the voltage by 45^o. The value of C is (2005)
A) $\frac{1}{\pi f(2\pi f L - R)}$
B) $\frac{1}{2\pi f(2\pi f L - R)}$
C) $\frac{1}{\pi f(2\pi f L + R)}$
D) $\frac{1}{2\pi f(2\pi f L + R)}$

34) A monatomic gas at pressure P_1 and volume V_1 is compressed adiabatically to $\frac{1}{8}^{th}$ of its original volume. Calculate the final pressure of the gas.
A) P_1
B) $64P_1$
C) $16P_1$
D) $32P_1$

35) From the following P-T graph what interference can be drawn?



A) $V_2 = V_1$
B) $V_2 > V_1$
C) $V_2 < V_1$
D) None of the above

36) In Millikan's oil drop experiment, an oil drop of mass 16×10^{-6} kg is balanced by an electric field of $10^6 V/m$. The charge in coulomb on the drop, assuming $g = 10\ m/s^2$ is
A) 16×10^{-13}
B) 16×10^{-11}
C) 6.2×10^{-11}
D) 16×10^{-9}

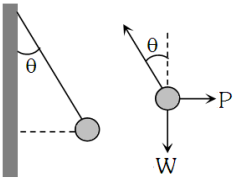
37) When load of 5kg is hung on a wire then extension of 3m takes place, then work done will be
A) 100 joule
B) 75 joule
C) 60 joule
D) 50 joule

38) Energy stored in electromagnetic oscillations is in the form of

A) magnetic energy.
B) electrical energy.
C) both (1) and (2).
D) none of these.

39) Water rises in a capillary tube to a certain height such that the upward force due to surface tension is balanced by 75×10^{-4} N force due to the weight of the liquid. If the surface tension of water is 6×10^{-2} Nm^{-1}, the inner circumference of the capillary must be
A) 0.50×10^{-2} m
B) 1.25×10^{-2} m
C) 6.5×10^{-2} m
D) 12.5×10^{-2} m

40) A metal sphere is hung by a string fixed to a wall. The sphere is pushed away from the wall by a stick. The forces acting on the sphere are shown in the second diagram. Which of the following statements is wrong?



A) $T^2 = P^2 + W^2$
B) $\vec{T}+\vec{P}+\vec{W}=0$
C) $T = P + W$
D) $P = W\tan\theta$

41) A piston of cross-section area 100 cm^2 is used in a hydraulic press to exert a force of 10^7 dynes on the water. The cross-sectional area of the other piston which supports an object having a mass 2000 kg is
A) 2×10^{10} cm^2
B) 10^9 cm^2
C) 2×10^4 cm^2
D) 100 cm^2

42) If potential (in volts) in a region is expressed as $V(x,y,z)=6xy-y+2yz$, the electric field (in N/C) at point (1, 1, 0) is (2015)
A) $-\left(2\hat{i}+3\hat{j}+\hat{k}\right)$
B) $-\left(6\hat{i}+9\hat{j}+\hat{k}\right)$
C) $-\left(3\hat{i}+5\hat{j}+3\hat{k}\right)$
D) $-\left(6\hat{i}+5\hat{j}+2\hat{k}\right)$

43) The specific charge of an electron is
A) 1.76×10^{-11} coulomb / kg
B) 1.76×10^{11} coulomb / kg
C) 4.8×10^{-10} stat coulomb
D) 1.6×10^{-19} coulomb

44) Statement 1 : The mutual induction between the coils is maximum, when two coils are wound on each other.
Statement 2 : Mutual induction is independent of the orientation of the coils.
A) Both statement 1 and statement 2 are true and the statement 2 is the correct explanation of the statement 1.
B) Both statement 1 and statement 2 are true but statement 2 is not the correct explanation of the statement 1.
C) Statement 1 is true but statement 2 is false.
D) The statement 1 and statement 2 both are false.

45) _____ is not an assumption of kinetic theory of gases.
A) The force of attraction between the molecules is negligible
B) The volume occupied by the molecules of the gas is negligible
C) The collision between the molecules are elastic
D) All molecules have same speed

46) The average force necessary to stop a bullet of mass 20 g moving with a speed of 250 m/s, as it penetrates into the wood for a distance of 12 cm is
A) 5.2×10^3 N
B) 4.2×10^3 N
C) 3.2×10^3 N
D) 2.2×10^3 N

47) Taking Rydberg's constant $R_H = 1.097\times10^7$ m first and second wavelength of Balmer series in hydrogen spectrum is
A) 6562 Å, 4863 Å
B) 6529 Å, 4280 Å
C) 2000 Å, 3000 Å
D) 1575 Å, 2960 Å

48) A satellite is launched into a circular orbit of radius R around the earth. A second satellite is launched into an orbit of radius (1.01)R. The period of the second satellite is larger than that of the first one by approximately
A) 3.0%
B) 1.5%
C) 1.0%
D) 0.5%

49) If 150 J of heat is added to a system and the work done by the system is 110 J, then change in internal energy will be
A) 260 J
B) 150 J
C) 110 J
D) 40 J

50) The period of a satellite in a circular orbit of radius R is T, the period of another satellite in a circular orbit of radius 4R is
A) 8T
B) 4T
C) T/8
D) T/4