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Physics mock test 7 2022-23

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

01) During constant temperature, we feel colder on a day when the relative humidity will be
A) 75%
B) 50%
C) 25%
D) 12.5%

02) The escape velocity for the earth is 11.2 km/s. The mass of another planet is 100 times that of the earth and its radius is 4 times that of the earth. The escape velocity for this planet will be
A) 280.0 km/s
B) 112.0 km/s
C) 56.0 km/s
D) 5.6 km/s

03) The velocity of electromagnetic wave is parallel to (2002)
A) $\vec{B}\times\vec{E}$
B) $\vec{E}\times\vec{B}$
C) $\vec{E}$
D) $\vec{B}$

04) r. m. s. velocity of nitrogen molecules at NTP is
A) 33 m/s
B) 492 m /s
C) 517 m/s
D) 546 m/s

05) A body revolved around the sun 27 times faster then the earth what is the ratio of their radii?
A) 1/27
B) 1/9
C) 1/4
D) 1/3

06) From the given statements, the false statement is :
A) If the radius of capillary is reduced to half, the rise of liquid column becomes four times.
B) Angle of contact $\theta = 90°$, if cohesive force = adhesive force.
C) Angle of contact $\theta > 90^{\circ}$, if cohesive force > adhesive force.
D) Angle of contact $\theta < 90^{\circ}$, if cohesive force < adhesive force.

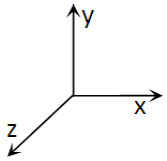
07) A horizontal force of 5 N is required to maintain a velocity of 2 m/s for a block of 10 kg mass sliding over a rough surface. The work done by this force in one minute is
A) 6 J
B) 60 J
C) 600 J
D) 6000 J

08) A radioactive nucleus undergoes a series of decay according to the scheme
$A \xrightarrow{\alpha} A_1 \xrightarrow{\beta} A_2 \xrightarrow{\alpha} A_3 \xrightarrow{\gamma} A_4$.
If the mass number and atomic number of A are 180 and 72 respectively, then what are these number for A_4?
A) 176 and 70
B) 176 and 69
C) 174 and 70
D) 172 and 69

09) The resistance $R = \frac{V}{i}$, where $V = 100 \pm 5$ volts and $i = 10 \pm 0.2$ amperes. What is the total error in R?
A) 6%
B) 7%
C) $\frac{5}{2}\%$
D) 5.2%

10) Three charges 4q, Q and q are in a straight line in the position of 0, 1/2 and 1 respectively. The resultant force on q will be zero, if Q =
A) 4q
B) $-\frac{q}{2}$
C) - q
D) -2q

11) Light wave is travelling along y-direction. If the corresponding $\vec{E}$ vector at any time is along the x-axis, the direction of $\vec{B}$ vector at that time is along



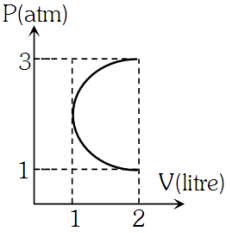
A) x-axis
B) y-axis
C) - z axis
D) + z-axis

12) A wheel has angular acceleration of 3.0 rad/s^2 and an initial angular speed of 2.00 rad/s. In a time of 2 s it has rotated through an angle (In radian) of
A) 4
B) 6
C) 10
D) 12

13) What is the stopping potential when the metal with work function 0.6 eV is illuminated with the light of 2 eV?
A) 0.8 V
B) 1.4 V

C) 2.6 V
D) 3.6 V

14) In the P-V diagram shown in figure ABC is a semicircle. The work done in the process ABC is



A) 4 atm-lt
B) $-\frac{\pi}{2}\text{atm}-\text{lt}$
C) $\frac{\pi}{2}\text{atm}-\text{lt}$
D) Zero

15) The upper end of a wire of radius 4 mm and length 100 cm is clamped and its other end is twisted through an angle of 30°. Then angle of shear is
A) 0.012°
B) 0.12°
C) 1.2°
D) 12°

16) On connecting a battery to the two corners of a diagonal of a square conductor frame of side a the magnitude of the magnetic field at the center will be
A) $\frac{4\mu_o i}{\pi a}$
B) $\frac{2\mu_o}{\pi a}$
C) $\frac{\mu_o}{\pi a}$
D) Zero

17) According to 'Newton's Law of cooling', the rate of cooling of a body is proportional to the
A) difference of the temperature of the body and the surroundings.
B) fourth power of the temperature of the body.
C) temperature of the surrounding.
D) temperature of the body.

18) A bar magnet is oscillating in the Earth's magnetic field with a period T. What happens to its period and motion if its mass is quadrupled? (2003, 1994)
A) Motion remains simple harmonic with time period $=\frac{T}{2}$
B) Motion remains S.H.M with time period $=2T$
C) Motion remains S.H.M. with time period $=4T$
D) Motion remains S.H.M and period remains nearly constant.

19) Consider the three waves z_1, z_2 and z_3 as $z_1 = A\sin(k\,x-\omega\,t)$, $z_2 = A\sin(k\,x+\omega\,t)$ and $z_3 = A\sin(k\,y-\omega\,t)$. Which of the following represents a standing wave?
A) $z_1+z_2+z_3$
B) z_3+z_1
C) z_2+z_3
D) z_1+z_2

20) Two point charges +8q and -2q are located at x = 0 and x = L respectively. The location of a point on the x-axis at which the net electric field due to these two point charges is zero is
A) $\frac{L}{4}$
B) 2 L
C) 4 L
D) 8 L

21) When a bicycle is in motion, the force of friction exerted by the ground on the two wheels is such that it acts
A) in the backward direction on the front wheel and in the forward direction on the rear wheel.
B) in the forward direction on the front wheel and in the backward direction on the rear wheel.
C) in the backward direction on both front and the rear wheels.
D) Both (1) and (3).

22) A coil of inductive reactance 31Ω has a resistance of 8Ω. It is placed in series with a condenser of capacitative reactance 25Ω. The combination is connected to an a.c. source of 110 V. The power factor of the circuit is (2006)
A) 0.33
B) 0.56
C) 0.64
D) 0.80

23) The ratio of areas within the electron orbits for the first excited state to the ground state for hydrogen atom is
A) 2 : 1
B) 4 : 1
C) 16 : 1
D) 18 : 1

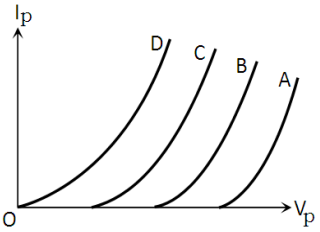
24) The average kinetic energy of a gas molecule at 27°C is 6.21×10^{-21} J. Its average kinetic energy at 227°C will be
A) 52.2×10^{-21} J
B) 11.35×10^{-21} J
C) 10.35×10^{-21} J
D) 5.22×10^{-21} J

25) A small object is placed 10 cm in front of a plane mirror. If you stand behind the object 30 cm from the mirror and look at its image, the distance focused for your eye will be
A) 20 cm
B) 60 cm
C) 80 cm
D) 40 cm

26) A body of mass m moving with velocity v collides head on with another body of mass 2m which is initially at rest. The ratio of K.E. of colliding body before and after collision will be
A) 9 : 1
B) 4 : 1
C) 2 : 1
D) 1 : 1

27) If $|\vec{A}\times\vec{B}|=\sqrt{3}\vec{A}.\vec{B}$, then the value of $|\vec{A}+\vec{B}|$ is
A) $\left(A^2+B^2+\frac{AB}{\sqrt{3}}\right)^{1/2}$
B) $(A^2+B^2+AB)^{1/2}$
C) $(A^2+B^2+\sqrt{3}AB)^{1/2}$
D) $A+B$

28) In the following figure four plate characteristics of a triode at different grid voltage are shown. The difference between successive grid voltage is 1 V. The curve, which will have maximum grid voltage is and what is its value?



A) A, V_g = 0
B) D, V_g = 0
C) A, V_g = + 4 V
D) B, V_g = + 4 V

29) P, Q and R are three balloons ascending with velocities U, 4U and 8U respectively. If stones of the same mass be dropped from each, when they are at the same height, then
A) stone from P reaches the ground first.
B) stone from Q reaches the ground first.
C) stone from R reaches the ground first.
D) all stones reach the ground at the same time.

30) The rest energy of an electron is 0.511 MeV. The electron is accelerated from rest to a velocity 0.5 c. The change in its energy will be
A) 0.105 MeV
B) 0.079 MeV
C) 0.051 MeV
D) 0.026 MeV

31) The velocity v of a particle at time t is given by $v = at + \frac{b}{t+c}$, where a, b and c are constants. The dimensions of a, b and c are [2006]
A) $[L],[LT]\text{and}\left[LT^{-2}\right]$
B) $\left[LT^{-2}\right],[L]\text{and}[T]$
C) $\left[L^2\right],[T]\text{and}\left[LT^{-2}\right]$
D) $\left[LT^{-2}\right],[LT]\text{and}[L]$

32) A mass of diatomic gas $(\gamma=1.4)$ at pressure of 2 atmospheres is compressed adiabatically so that its temperature rises from 27^oC to 927^oC. The pressure of the gas in the final state is (2011)
A) 8 atm
B) 28 atm
C) 68.7 atm
D) 256 atm

33) A current of 2 A flows through a 2Ω resistor when connected across a battery. The same battery supplies a current of 0.5 A when connected across a 9Ω resistor. The internal resistance of the battery is (2011)
A) 0.5Ω
B) $\frac{1}{3}\Omega$
C) $\frac{1}{4}\Omega$
D) 1Ω

34) A cut diamond sparkles because of its
A) high refractive index.
B) hardness.
C) emission of light by the diamond.
D) absorption of light by the diamond.

35) A ball of mass 0.25 kg attached to the end of a string of length 1.96 m is moving in a horizontal circle. The string will break if the tension is more than 25 N. What is the maximum speed with which the ball can be moved? (1998)
A) 5 m/s
B) 3 m/s
C) 14 m/s
D) 3.92 m/s

36) The power of a sound from the speaker of a radio is 20 mW. The power of the sound is increased to 400 mW by turning the knob of the volume control. The power increase in decibels as compared to the original power is
A) 800 dB
B) 20 dB
C) 13 dB
D) 10 dB

37) A straight conductor of length 0.4 m is moved with a speed of 7 m/s perpendicular to the magnetic field of intensity of 0.9 Wb/m^2. The induced e.m.f. across the conductor will be
A) 1.25 V
B) 2.52 V
C) 3.75 V
D) 7.25 V

38) What is the rest mass of photon?
A) $\frac{h\upsilon}{\lambda}$
B) $\frac{h\upsilon}{c^2}$

C) $\frac{h\upsilon}{c}$

D) Zero

39) The periodic time of a simple pendulum of length 1 m and amplitude 2 cm is 5 seconds. If the amplitude is made 4 cm, its periodic time in seconds will be

A) $5\sqrt{2}$

B) 10

C) 5

D) 2.5

40) If two liquids of same volume but different densities ρ_1 and ρ_2 are mixed, then density of mixture is given by

A) $\rho = \frac{\rho_1 \rho_2}{\rho_1 + \rho_2}$

B) $\rho = \frac{2\rho_1 \rho_2}{\rho_1 + \rho_2}$

C) $\rho = \frac{\rho_1 + \rho_2}{2\rho_1 \rho_2}$

D) $\rho = \frac{\rho_1 + \rho_2}{2}$

41) During an adiabatic expansion of 2 moles of a gas, the change in internal energy was found -50J. The work done during the process is

A) Zero

B) 100 J

C) 50 J

D) - 50 J

42) From a circular ring of mass M and radius R, an arc corresponding to a 90° sector is removed. The moment of inertia of the remaining part of the ring about an axis passing through the centre of the ring and perpendicular to the plane of the ring is k times MR^2. Then the value of k is

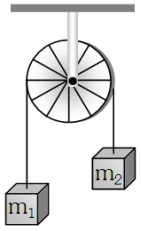
A) 1

B) 1/4

C) 3/4

D) 7/8

43) Two masses m_1 and m_2 are attached to a string, which passes over a frictionless smooth pulley. When m_1 = 10 kg and m_2 = 6 kg, the acceleration of masses is



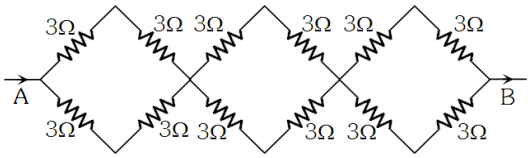
A) $5\ m/s^2$

B) $2.5\ m/s^2$

C) $10\ m/s^2$

D) $20\ m/s^2$

44) In the network of resistors shown in the adjoining figure, the equivalent resistance between A and B is



A) 9 ohm

B) 18 ohm

C) 36 ohm

D) 54 ohm

45) In Young's double slit experiment, if the slit widths are in the ratio 1 : 9, then the ratio of the intensity at minima to that at maxima will be

A) 1/3

B) 1/4

C) 1/9

D) 1

46) An electric dipole of dipole moment p is aligned parallel to a uniform electric field E. The energy required to rotate the dipole by 90° is (2013)

A) p^2E

B) pE

C) infinity

D) pE^2

47) A particle is moving in a vertical circle. The tensions in the string when passing through two positions at angles 30° and 60° from vertical (lowest position) are T_1 and T_2 respectively. then

A) $T_1 = T_2$

B) $T_1 > T_2$

C) $T_2 > T_1$

D) Tension in the string always remains the same.

48) Potentiometer wire of length 1 m is connected in series with 490 Ω resistance and 2V battery. If 0.2 mV/cm is the potential gradient, then resistance of the potentiometer wire is

A) 7.9 Ω

B) 6.9 Ω

C) 5.9 Ω

D) 4.9 Ω

49) An electron having charge 'e' and mass 'm' is moving in a uniform electric field E. Its acceleration will be

A) $\frac{mE}{e}$

B) $\frac{eE}{m}$

C) $\frac{E^2e}{m}$

D) $\frac{e^2}{m}$

50) When NPN transistor is used as an amplifier,

A) holes moves from base to emitter.

B) electrons moves from base to emitter.

C) electrons move from emitter to base.

D) electrons move from base to emitter.