GGSIPU physics 2010

1. A wire whose cross-section area is 4 mm^2 is stretched by 0.1 mm by a certain weight. How far will a wire of the same material and length stretch,If its cross-sectional area is 8 mm^2 and the same weight is attached?

a 0.5 mm b 1.0 mm

c 0.05 mm d 0.06 mm

2. A body has a charge of – 2 μC.If it has 2.5x10^{13} protons, then how many electrons the body ha ?

a 1.25x10^{13} b 2.5x10^{13}

c 3.75x10^{13} d None of these

3. When light passes from one medium to other, then which of the following maychange ?

a Velocity and frequency

b Frequency and colour

c Velocity,wavelength and colour

d Velocity and wavelength

4. Mark the correct option.

a Ampere's law states that flux B th rough any closed surface is μ_0 times the current passing through the area bounded by closed surface

b Gauss's law for magnetic field in magnetostatics serves the same purpose as Gauss's law for electric for electric field in electrostatics

c gauss's law for magnetic field states that the flux of B through any closed surface is always zero, wheather or not there are currents within the surface

d All the above

5. When a particle is moving in vertical circle,

a its redial and tangential acceleration both are constant

b its redial and tangential acceleration both are varying

c its redial acceleration is constant but tangential acceleration is varying

d Its redial acceleration is varying but tangential acceleration is constant

6. 1 g of steam at 100^0 C mass of ice at 0^0C are mixed.The temperature of the mixture in steady state will be latent heat of stem = 540 cal/g, latent heat of ice = 80 cal/g

a 50 ^{0}C b 100 ^{0}C

c 67 ^{0}C d 33 ^{0}C

7. A tuning fork of frequency 580 Hz is employed to produce transverse waves on a long rope. The distance between the nearest crests is found to be 20 cm.The velocity of the wave is

a 58 ms $^{-1}$ b 580 ms $^{-1}$

c 20 ms $^{-1}$ d 116 ms $^{-1}$

8. Two instruments having stretched strings are being played in unison.When the tension of one of the instruments is increased by 1%,3 beats are produced in 2 s.The initial frequency of vibration of each wire is

a 300 Hz b 500 Hz

c 1000 Hz d 400 Hz

9. A circular coil of 200 turns and redius 10 cm is placed in an uniform magnetic field of o.1 T normal to the p,an of the coil.The coil carries a current of 5 A.The coil is made up of copper wire of cross-sectional area 10^{-5} m^2 and the number of free electrons per unit volume of copper is 10^{29}. The average force experienced by an electron in the coil due to magnetic field is

a 5x10 $^{-25}$ b Zero

c $8x10^{-24}$ d None of these

10. Long distance short-wave radio broad casting uses

a ground wave b ionospheric wave

c direct wave d sky wave

11. If the chage of 10 μC are given to two plates of a capacitor which are connected across a battery of 12 V, find the capacitance of the capacitor.

a 0.33 μF b 0.5 μF

c 0.41 μF d 0.66 μF

12. When 1 g of water changes from liquid to vapour phase at constant pressure of 1 atm,the volume increases from 1 cc to 1671 cc .The heat of vaporization at the pressure is 540 cal/g.Find the increase in internal energy of water.

a 2268 J b 2099.33 J

c 2000 J d 2019.65 J

13. With the usual notations, the following equations $s_t = u+\frac{1}{2}a2t$ -1 is

a only numerically correct

b only dimensio nally correct

c Both numerically and dimensionally correct

d Neither numerically nor dimensionally correct

14. Abody is sliding down on a smooth inclined plane slides down the complete plane in

a 4 s b 5 s

c 2 s d 3 s

15. If a H_2 nucleus is completely converted into energy, the energy produced will be around

a 1 MeV b 939 MeV

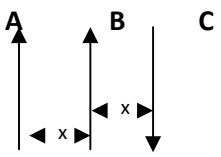
c 9.39 MeV d 238 meV

16. A taransistor is used in common-emitter configuration.Given its α = 0.9, calculate the change in collector current when the base current changes by 2μA.

a 1 μA b 0.9 μA

c 30 μA d 18 μA

17. A,B and C are parallel conductors of equal lengths carrying currents I,I and 2I respectively.Distance between A and B is x.Distance between B and C is also x.F_1 is thje force exerted by B on A. F_2 is the force exerted by C on A.Choose the correct answer.



a $F_1 = 2\ F_2$

b $F_2 = 2\ F_1$

c $F_1 = F_2$

d $F_1 = -F_2$

18. What is the modulation index if an audio signal of amplitude one-half of the carrier amplitude is used in AM ?

a 1 b 0

c 0.5 d > 1

19. A steel wire 10 m long and 10^{-5} m^2 in cross-sectional area elongates by 0.01 m under a tension of 2500 N. Young's modules for steel from the data is computed as

a 2.5×10^{7} Nm^{-2} b 2.5×10^{9} Nm^{-2}

c 2.5×10^{11} Nm^{-2} d None of these

20. A wire of length L and radius r is fixed at one end. When a stretching force F is applied at free end,the elongation in the wire is l.When another wire of same material but of length 2L and redius 2r, also fixed at one end is stretched by a force 2F applied at free end, then elongation in the 2nd wire will be

a l/2 b l c 2l d l/4

21. A block rest on a horizontal table which is executing SHM in the horizontal with an amplitude a if the coefficient of friction is μ, then the block just start to slip when the frequency of oscillation is

a $\frac{1}{2\pi}\sqrt{\frac{\mu g}{a}}$ b $2\pi\sqrt{\frac{a}{\mu g}}$

c $\frac{1}{2\pi}\sqrt{\frac{a}{\mu g}}$ d $\sqrt{\frac{a}{\mu g}}$

22. Three objects coloured black,grey and white can withstand hostile conditions at 2800^0C.These objects are thrown into furnace where each of them attains a temperature of 2000^0C.Which object will glow brightest ?

a The white object

b The black object

c All glow with equal brightness

d Grey object

23. A black body is at temperature of 2800 K.The energy of radiation emitted by this object with wavelength between 499 nm and 500 nm is U_1,between 999 nm and 1000 nm is U_2 and between 1499 nm and 1500 nm is U_3. The Wient's constant, b=2.88x10^6 nm-K. Then,

a $U_1=0$ **b** $U_3=0$

c $U_1>U_2$ **d** $U_2>U_1$

24. For light of wavelength 200 nm shines on an aluminium, 4.20 eV is required to eject an electron. What us te kinetic energy of the fastest ejected electrons ?

a $\frac{1240}{\lambda}$ **b** $\frac{1200}{\lambda}$

c $\frac{\lambda}{1240}$ **d** $\frac{1360}{\lambda}$

25. Light of wavelength 200 nm shines on an aluminium, 4.20 eV is required to eject an electron. What is the kinetic energy of the fastest ejected electrons ?

a 0.5 eV **b** 1.00 eV

c 2.00 eV **d** 4.00 eV

26. A body dropped from a height h with an initial speed zero reaches the ground with a velocity of 3 km/h.Another body of the same mass was dropped from the same height h with an initial speed 4km/h will reach the ground with a velocity of

a 3 km/h **b** 4 km/h

c 5 km/h **d** 12 km/h

27. When the plane surface of a planoconvex lens of refractive index 1.5 is silvered, it behaves like a concave mirror of focal length 30 cm. When its convex surface is silvered, it will behave like a concave mirror of focal length

a 10 cm **b** 20 cm

c 30 cm **d** 45 cm

28. In the visible region of the spectrum the rotation of the plane of polarization is given by

$\theta = a+\frac{b}{\lambda^2}$

The optical rotation produced by a particular material is found to be 30^0 per mm at λ=5000 $\mathring{A}$ and 50^0 per mm at λ= 4000 $\mathring{A}$.The value of constant a will be

a + $\frac{50^0}{9}$ per mm **b** - $\frac{50^0}{9}$ per mm

c + $\frac{9^0}{50}$ per mm d - $\frac{9^0}{50}$ per mm

29. 3.0 mW of 400 nm light is incident on a photoelectric cell, if 0.1% of the photons are contributing in ejection of electrons, then the current in the cell is

a 0.48 μA

b resistance value not given

c zero

d 0.96 μA

30. The scale of a spring balance reading from 0 to 10 kg is 0.25 m long.A body suspended from the balance oscillates vertically with a period of π/10 s. The mass suspended is neglect the mass of the spring

a 10 kg b 0.98 kg

c 5 kg d 20 kg

31. At the height 80 m, an aeroplane is moving with 150 m/s.A bomb is dropped from it so as to hit a target. At what distance from the target should the bomb be dropped?

Given g = 10 m/s^2

a 605.3 m b 600 m

c 80 m d 230 m

32. A spring balance and a physical balance are kept in a lift. In these balances equal masses are placed. If now the lift starts moving upwards with constant acceleration, then

a the reading of spring balance will increase and the equilibrium position of the physical balance will disturb

b the reading of spring balance will remain unchanged and physical balance will remain in equilibrium

c the reading of spring balance will decrease and physical balance will remain in equilibrium

d the reading of spring balance will increase

33. Starting from rest a body sliudes down a 45^0 down the same distance in the absence of friction. The coefficient of friction between the body and inclined plane is

a 0.33 b 0.25

c 0.75 d 0.80

34. A bomb of mass 1 kg explodes into 2 pieces of mass 3 kg and 6 kg. The velocity of mass 3 kg is 1.6 m/s, the KE of mass 6 kg is

a 3.84 J b 9.6 J

c 1.92 J d 2.92 J

35. There are two bodies of masses 100 kg and 10000 kg separated by a distance 1 m. At what distance from the smaller body , the intensity gravitational field will be zero?

a $\frac{1}{9}$ m b $\frac{1}{10}$ m

c $\frac{1}{11}$ m d $\frac{10}{11}$

36. If longitudinal strain for a wire is 0.03 and its poisson ratio is 0.5, then its lateral strain is

a 0.003 b 0.0075

c 0.015 d 0.4

37. Equal masses of water and a liquid of density 2 are mixed together, then the mixture has density of

a $\frac{2}{3}$ b $\frac{4}{3}$

c $\frac{3}{2}$ d 3

38. The volume of a gas at 21^0 C temperature and 76.8 mm pressure is 1 L.If the density of the gas is 1.2 g/L at NTP, then its mass will be

a 4 g b 4.21 g

c 1. 13 g d 10 g

39. When heat is given to gas in an isothermal change, the result will be

a external work done

b rise in temperature

c in crease in internal energy

d external work done and also rise in temperature

40. The temperature gradient of 0.5 m long rod is 80^0C/m.If the temperature of hotter end of the rod is 30^0C, then the temperature of the cooler end is

a $40\ ^0C$ b $-10^0\ C$

c $10\ ^0C$ d $0\ ^0C$

41. For any SHM, amplitude is 6 cm. If instantaneous potential energy is half the total energy energy then distance of particle from its mean position is

a 3 cm b 4.2 cm

c 5.8 cm d 6 cm

42. Electric potential at any point is V= -5x+3y+$\sqrt{15}$z,then the magnitude of the electric field is

a 3 $\sqrt{2}$ b 4 $\sqrt{2}$

c 5 $\sqrt{2}$ d 7

43. The insulation property of air breaks down at $E=3x10^6$ V/m.The maximum charge that can be given to a sphere a diameter 5 m is approximatelyin coulomb

a $2x10^{-2}$ b $2x10^{-3}$

c $2x10^{-4}$ d $2x10^{-5}$

44. Two wires A and B of same material and mass have their lengths in the ratio 1:2. On connecting them to the same source,the rate of heat dissipation in B is found to be 5 W. The rate of heat B dissipation in A, is

a 10 W b 5 W

c 20 W d None of these

45. Maximum kinetic energy of the positive ion in the cyclotron is

a $\frac{q^2Br_0}{2m}$ b $\frac{q^2B^2r_0}{2m}$

c $\frac{q^2B^2r_0^2}{2m}$ d $\frac{qBr_0}{2m^2}$

46. The magnet flux can be completely demagnized by

a breaking the magnet into small piece

b heating it slightly

c droping it into ice cold water

d a reverse field of appropriate strength

47. The magnetic flux linked with a coil at any instant t is given by $\phi = 5t^3-100t+300$, the emf induced in coil in the coil at t = 2 s is

a 1.4 eV b 1.1 eV

c 5.4 eV d 6.8 eV

48. A photon of energy 3.4 eV is incident on a metal having work function 2 eV. The maximum KE of photo electrons is equal to

a 1.4 eV b 1.1 eV

c 5.4 eV d 6.8 eV

49. Order of magnitude of density of uranium nucleus is $m_p = 1.67 \times 10^{-27}$ kg

a 10^{20} kg/m^3 b 10^{17} kg/m^3

c 10^{14} kg/m^3 d 10^{11} kg/m^3

50. A ball is thrown from the ground with a velocity of $20\sqrt{3}$ ms^{-1} making an angle of 60^0 withb the horizontal.The ball will be at a height of 40 m from the ground after a time t equal to g=10 ms $^{-2}$

a $\sqrt{2}$s b $\sqrt{3}$s

c 2 s d 3 s