# MOCK cet paper II – 2012 (PHYSICS)

1. The equations of two sound waves are given by $Y_1 = 3 \sin 100\pi t$ and
   $Y_2 = 4 \sin 150 \pi t$. The ratio of the intensities of sound produced in the
   medium is
   1) 1:2   2) 1:4   3) 3:4   4) 4:3

2. Mass defect of an atom refers to
   1) Inaccurate measurement of the mass of the nucleus
   2) Packing fraction
   3) Mass used to produce energy to bind the nucleons
   4) Difference in the number of protons and neutrons in the nucleus

3. In a common emitter transistor circuit the collector current $I_c = 1.3$ m A
   and the base current $I_B = 200$ micro A. The emitter current is
   1) 1 m A   2) 1.5 m A   3) 1.32 m A   4) 1.1 m A

4. The dimensional formula for magnetic flux

   1) $M L T^{-2} A^{-2}$ 2) $M L^2 T^{-2} A^{-2}$ 3) $M L^2 T^{-1} A^{-2}$ 4) $M L^2 T^{-2} A^{-1}$

5. Depletion region in a semiconductor diode is a zone consisting of

   1) holes only   2) free electrons only

   3) both holes and electrons   4) neither electrons nor holes

6. The ascending order of the strengths of three basic forces gravitation,

   Nuclear and electromagnetic is

   1) Electromagnetic, gravitation, nuclear
   2) Gravitation, electromagnetic, nuclear
   3)   Nuclear, electromagnetic, gravitation
   4) Nuclear, gravitation, electromagnetic

7. Hydrogen atom emits blue light when it makes a transition from n=4 to

   n=2 state. If it makes a transition from n=5 to n=2 which colour light it

   emits?

   1) red   2) yellow   3) green   4) violet

8. In the photo-electric equation $h\vartheta = h\vartheta_0 + \frac{1}{2}mv^2$, v represents

   1) Maximum velocity of the photo electrons

   2) minimum velocity of photo electrons

   3) mean velocity of all the electrons

   4) velocity of photon

9. Two masses of 5 Kg and 3 Kg are placed in contact with each other on a frictionless horizontal surface as shown in the figure. If a force of 4 N is applied on the bigger mass the force on the smaller mass is

   1) 4N   2) 2 N   3) 0.5 N   4) 1.5 N
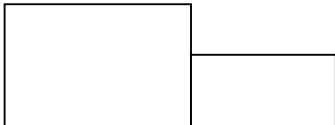
10. A 2 Kg mass is placed on a horizontal surface having kinetic friction 0.4 and static friction 0.5. If the force applied on the body is 2.5 N the frictional force acting on the body is

    1) 2.5 N   2) 8 N   3) 20 N   4) 25 N

11. If a force vector is applied on a mass is represented by $\vec{F} = 3\hat{\imath} - 4\hat{\jmath} + 5\hat{k}$

    Accelerated it with 2 ms^{-1}, then the mass in Kg is

    1) $2\sqrt{5}$ 2) $\sqrt{5}$ 3) $5\sqrt{2}$ 4) 50

12. Photo diode operates in
    1) Forward biased mode
    2) Reverse biased mode
    3) Forward or reverse biased depending on the material
    4) Both forward and reverse biased mode

13. Fundamental particles and their anti particles generally have
    1) Same spin, same mass and same charge
    2) Same mass, same spin and opposite charge
    3) Same spin, different mass, same charge
    4) Different spin, different mass and opposite charge

14. A radioactive material at a given instant emits 100 particles per second. After 5 minutes it emits 5 particles per second. Then its decay constant is

1) 0.83 s^{-1} 2) 5 min^{-1} 3) 0.6 s^{-1} 4) 0.6 min^{-1}

15. The angular momentum in the nth Bohr orbit is given by

1) nh/2π 2) h/2π 3) h/2nπ 4) nh

16. If λ represents the de-Broglie wavelength of a meson and 'p' momentum then the dimensions of λ is

1) $M L T^{-1}$ 2) $M^0 L^0 T^1$ 3) $M^0 L^1 T^0$ 4) $M^2 L T^{-1}$

17. A piece of iron has a resistance of 13.1 Ω at 50^0 C 16.2Ω at 100^0 C. Its resistance at 0^0C is

1) 20Ω 2) 12Ω 3) 8Ω 4) 10Ω

18. An a.c source E=200$\sqrt{2}$ sin 100 t is connected across a circuit containing an a.c. ammeter and a capacitor of capacity $1\mu F$. Then the reading of the ammeter is

1) 10 mA   2) 20 mA   3) 40 mA   4) 80 mA

19. In an ideal transformer the voltage and current in a primary are 100 V , 2 amperes and that in the secondary are 1000 V , **I** ampere. Then the value of **I** is

1) 0.2 A   2) 1 A   3) 20A   4) 2 A

20. Magnetic dip at a place where $B_H = \sqrt{3}$ B$_V$ is

1) 90^0 2) 60^0 3) 30^0 4) 45^0

21. An electron is moving with a speed 10^6 ms^{-1}. Its de-Broglie wavelength is

1) 0.7 nm   2) 7 nm   3) 6.6 nm   4) 54 nm

22. If B$_v$ = 3 X 10^{-5} T and B$_H$ = 4 X 10^{-5} T the earth's total field at a place is given by

1) 5 X 10^{-5} T   2) $\sqrt{7}X10^{-5}$T)   3)5 $\sqrt{5}X10^{-5}$T   4) 25 X 10^{-5} T

23. Two coils are placed in a circuit such that a current changes by 3 A in the first coil and a magnetic field changes by 1.2 T in the second coil. The value of mutual inductance of the coil is

   1) 0.2 H   2) 0.4 H   3) 3.6 H   4) 0.6 H

24. The varying electric field produces magnetic field. This is known as

   1) Laplace's law   2) Faraday's law

   3) Ampere's law   4) Maxwell's law

25. The inductance of a coil is 5 H. What is its effective reactance is dc circuit?

   1) zero   2) infinity   3) 5Ω 4) 0.2Ω

26. No force acts on a current carrying conductor in a magnetic field, when the angle between the direction of the current and the magnetic field

   1) $\dfrac{\pi}{2}$ 2) $\dfrac{3\pi}{4}$ 3) $\dfrac{\pi}{4}$ 4) zero

27. Two wires A and B of same material having radii in the ratio 1: 2 and carry currents in the ratio of 4: 1. The ratio of the drift speeds of the electrons in A & B is

   1) 1: 16   2) 16 : 1   3) 1 : 2   4) 4 : 1

28. A 4 micro farad capacitor is charged to 400 V and then its plates are joined through a resistance of 1 KΩ. The heat produced in the resistor is

   1) 0.16 J   2) 0.32 J   3) 1.28 J   4) 0.64 J

29. The total electric flux leaving spherical surface of radius 0.01 m and surrounding an electric dipole is

   1) ε/q 2) zero   3) $2q/\varepsilon$ 4) $8\pi r^2 q/\varepsilon$

30. A spherical shell of metal consists of a positive point charge at the centre. Then

    1) the electric field is zero outside the shell

    2) the electric field is zero everywhere

    3) the electric field is zero in the region inside the shell

    4) the electric field is non-zero in both the regions outside and inside the shell

31. What happens to the width of the central diffraction maximum when the width of the aperture is increased?

    1) Increases   2) Decreases   3) Unchanged   4) Disappears

32. The nature of graph between the separation of the slits and fringe width in case of Young's double slit experiment is

    1) Straight line with positive slope

    2) Straight line with negative slope

    3) Parabola

    4) Rectangular hyperbola

33. For a doubly refracting crystal, the refractive indices of ordinary and extraordinary rays are denoted by n_0 and n_e respectively. Which of the relations is valid along the optic axis of the crystal?

    1) $n_0 > n_e$ 2) $n_0 < n_e$ 3) $n_0 = n_e$ 4) $n_0 \leq n_e$

34. In the propagation of electromagnetic waves, the angle between the direction of propagation and the plane of polarisation in degree is

    1) 0   2) 90   3) 45   4) 180

35. The path difference between interfering waves at a point on a screen is 8.5 times the wavelength. The point is

    1) Dark   2) Bright

    3) Neither dark nor bright   4) Insufficient data

36. A wire has a resistance of 10Ω. A second wire of same material is having length double and radius half that of the wire. The resistance of the second wire is

    1) 20 Ω   2) 80 Ω   3) 40 Ω   4) 10 Ω

37. When light wave suffers reflection at the interface between air and glass, the change in phase of the reflected wave is equal to

    1) 0   2) $\pi/2$ 3) π 4) 2π

38. Quantity of heat that is absorbed during the change of state without rise in temperature is known as

    1) Specific heat   2) Latent heat

    3) Thermal conductivity   4) Water equivalent

39. The velocity of sound in glass in which two waves of length 50cm and 50.4cm produces 6 beats per second is

    1) 340m/s   2) 380m/s   3) 378m/s   4) 348m/s

40. Which of the following can be expressed in newton per kilogram?

    1) Impulse   2) velocity

    3) Acceleration   4) angular momentum

41. A constant force of 25 N is applied is applied at an angle of 45^0 on a lawn mower. The work done in pushing the mower through a distance of 40 m is

    1) $500\sqrt{2}$ J   2)500 J   3)250 J   4) 1000 J

42. A book is kept on the table. The angle between the action of the book on the table and the reaction of the table on the book is

    1) 0^0 2) 180^0 3) 90^0 4) 270^0

43. A body of mass 8 Kg at rest explodes into three pieces. Two pieces of mass 2 Kg each are thrown off in perpendicular directions with velocities of 3 ms^{-1} and 4 ms^{-1} respectively. The third piece will travel with a velocity in meter per second

    1) 5   2) 3.5   3) 2.5   4) 4

44. A particle of mass 'm' is rotating by means of a string in a vertical circle. The difference in the tensions at the bottom and the top is

    1) zero   2) 6 mg   3) 4 mg   4)2 mg

45. Water rises in the plant fibres due to

    1) Osmosis   2) fluid pressure   3) capillarity   4) viscosity

46. A 10 kg box is suspended by a string from an overhead support. If a horizontal force of 17.3 kg is applied to the box, the angle made by the string with the vertical is

   1) 30^0 2) 75^0 3) 45^0 4) 60^0

47. A triatomic gas is heated isothermally. The percentage of heat energy used to increase the internal energy is

   1) 14 %   2) 60%   3) 100%   4) zero

48. Two blocks of ice when pressed together join to form one block, this happens because

  1) Melting point rises with pressure   2) melting point falls with pressure

  3) heat is absorbed from outside   4) heat is rejected to outside

49. A straight wire of 5 m length carrying a current of 5 A is placed at a distance of 0.1 m from an infinitely long straight conductor. If 2 A of current flows through this wire the force on 5 m wire is given by

   1) 1000 N   2) 10^{-7} N   3) $\frac{\mu_0}{4\pi} X 10^{-7}$ N   4) $\frac{\mu_0}{4\pi} X 10^3$ N

50. Heat is absorbed by a body but its temperature does not change. Which of the following statements explains the phenomena?

  1)Only kinetic energy of vibration increases

  2) only potential energy of intermolecular force field increases

  3) no increase in internal energy takes place

  4) increase in kinetic energy is balanced by decrease in potential energy

51. The region in the earth's atmosphere where earth's magnetic field is effective is known as

1) mesosphere   2) ionosphere   3) magnetosphere   4) thermosphere

52. When light travels from one optical medium to another the characteristic which does not change is

1) Speed   2) frequency   3) wavelength   4) amplitude

53. Interference was observed in the interference chamber, when air was present. When the chamber is evacuated and a careful observation shows

1) no interference

2) Interference with bright fringes

3) Interference with dark fringes

4) Interference with slightly increased fringe width

54. A ray of light strikes a glass plate at an angle of 60^0. If the reflected and the refracted rays are perpendicular to each other the refractive index of glass is

1) $\sqrt{3}/2$ 2) 3/2   3) 1/2   4)$\sqrt{3}$

55. A convex lens of focal length 0.4 m is in contact with a concave lens of focal length 0.25 m. The power of the combination is

1) -1.5 D   2) -6.5 D   3) -0.66 D   4)+ 0.66 D

56. For a prism of glass of refractive index $\sqrt{3}$ the angle of minimum deviation is equal to the refracting angle of the prism. The angle of the prism is

1) 40^0 2) 60^0 3) 30^0 4) 90^0

57. The relation between magnetic susceptibility $\aleph$, and relative permeability μ_r is

1) $\aleph, = \mu_r - 2$ 2) $\aleph, = \mu_r + 2$

3) $\aleph, = \mu_r - 1$ 4) $\aleph, = \mu_r + 1$

58 The resistance of each arm of a wheatstone's bridge is 25Ω. A resistance of 25Ω is connected in series with the galvanometer of resistance 50Ω. The equivalent resistance appearing across the battery is

1)25 Ω   2) 100Ω   3) 2.5Ω   4) 20Ω

59. A metallic piece at temperature 27^0C is heated to 327^0C. The rate at which energy radiated from it increases by

1) 2 times   2) 4 times   3) 8 times   4) 16 times

60. The speed of sound in air is directly proportional to

1) square of adiabatic elasticity   2) square root of adiabatic elasticity

3) adiabatic elasticity   4) square root of isothermal elasticity

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