PHYSICS

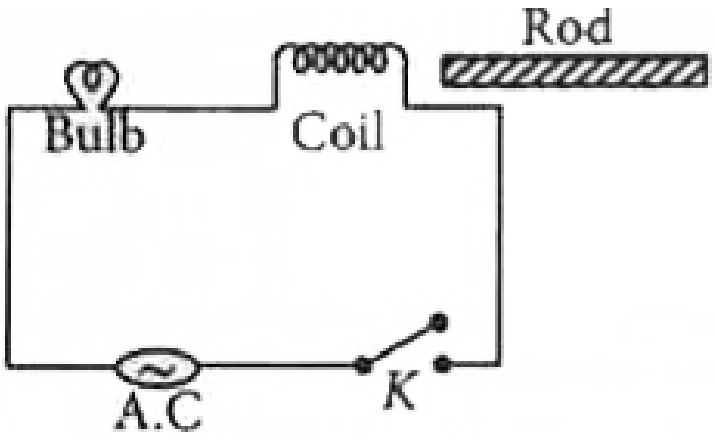
BOOKS - KCET PREVIOUS YEAR PAPERS

KARNATAKA CET 2017

Physics

1. In the A. C. circuit shown, keeping 'K' pressed, if an iron rod is inserted into the coil, the bulb

in the circuit



A. gets damaged

B. glows less brightly

C. glows with same brightness (as before the rod is inserted)

D. glows more brightly

Answer: B

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2. A basic communication system consists of

(a) Transmitter

(b) Information source

(c) User of information

(d) Channel (e) Receiver

The correct sequence of the arrangement is

A. b, e, a, d and c

B. b, a, d, e and c

C. a, b, c, d and e

D. b, d, a, c and e

Answer: B

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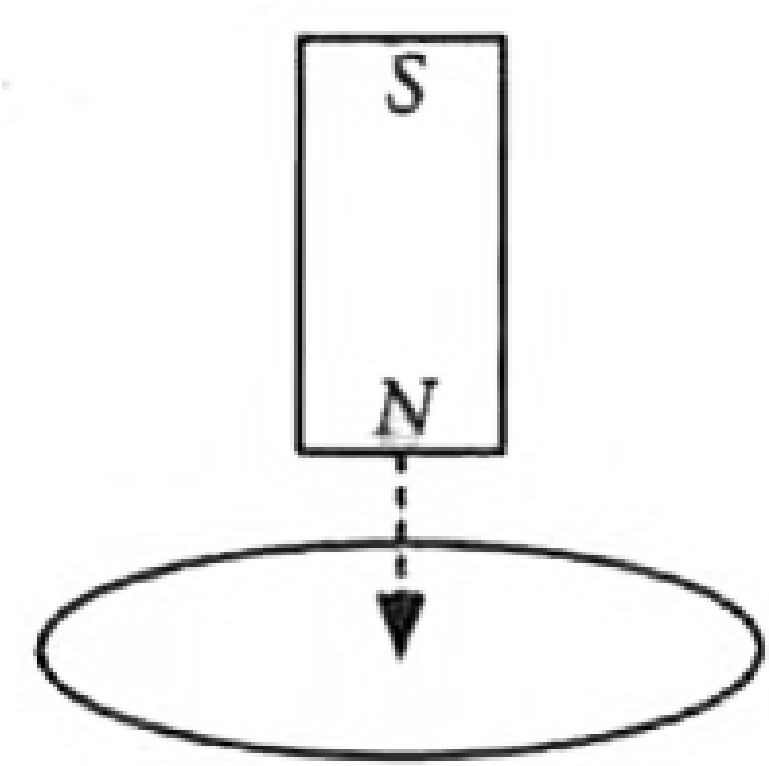
3. A bar magnet is allowed to fall vertically through a copper coil placed in a horizontal

plane. The magnet falls with a net acceleration



A. $= g$

B. Zero

C. $< g$

D. $> g$

Answer: C

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4. Two spheres of electric charges +2 nC and -8 nC are placed at a distance d apart. If they are allowed to touch each other, what is the new distance between them to get a repulsive force of same magnitude as before?

A. $\frac{d}{2}$

B. d

C. $\frac{3d}{4}$

D. $\frac{4d}{3}$

Answer: C

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5. The partlcles emitted 1n the decay of $^{238}_{92}U$ to $^{234}_{92}U$

A. 2 α and 2 β

B. 1 α and 2 β

C. 1 α and 1 β

D. 2 α only

Answer: B

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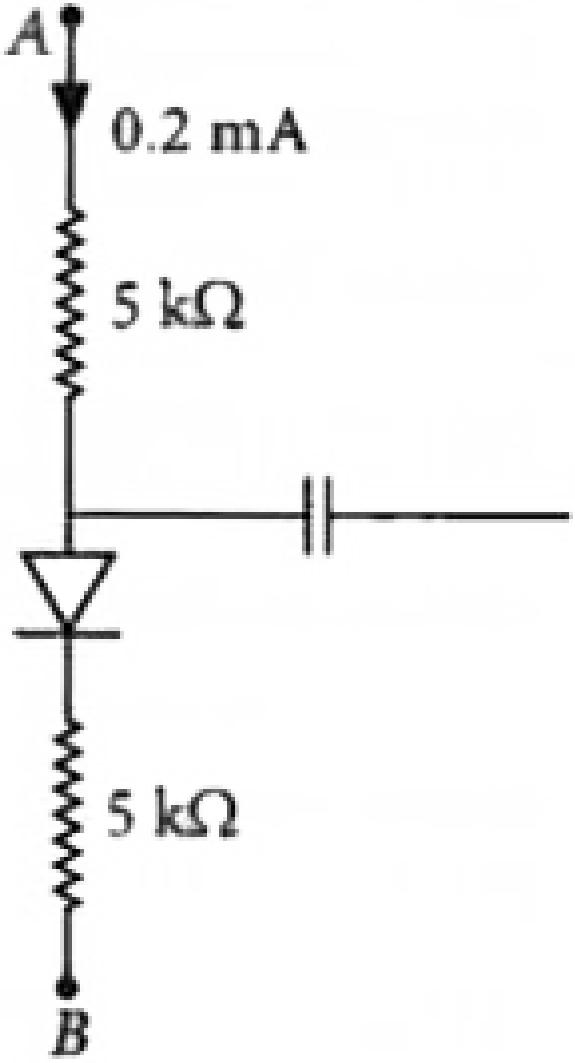
6. In the figure shown, if the diode forward voltage drop is 0.2 V, the voltage differenc

between A and B is



A. 1.3 V

B. 2.2 V

C. 0.5 V

D. 0

Answer: B

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7. In Young's double - slit experiment if yellow light is replaced by blue light, the interference fringes become

A. wider

B. brighter

C. narrower

D. darker

Answer: C

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8. A system of 2 capacitors of capacitance $2\mu F$ and $4\mu F$ is connected in series across

potential difference of 6 V. The electric charge and energy stored in the system are

A. $1\mu C$ and $3\mu J$

B. $8\mu C$ and $24\mu J$

C. $10\mu C$ and $30\mu J$

D. $36\mu C$ and $108\mu J$

Answer: B

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9. 4×10^{10} electrons are removed from a neutral metal sphere of diameter 20 cm placed in air. The magnitude of the electric field (in NC^{-1}) at a distance of 20 cm from its centre is

A. Zero

B. 5760

C. 640

D. 1440

Answer: D

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10. Write the SI unit of specific heat of a substance.

A. $Jkg^{-1}K^{-1}$

B. $Jmol^{-1}K^{-1}$

C. Jkg^{-1}

D. JK^{-1}

Answer: A

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11. A coil of inductive reactance $1/\sqrt{3}\Omega$ and resistance 1 Ω is connected to a 200 V, 50 Hz A.C. supply. The time lag between maximum voltage and current is

A. $\frac{1}{600}s$

B. $\frac{1}{200}s$

C. $\frac{1}{300}s$

D. $\frac{1}{500}s$

Answer: A

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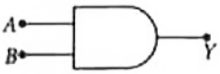
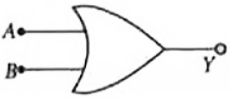
12. Which of the following logic gates considered as universal?

A. 

B. 

C. 

D. 

Answer: B

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13. Which of the following semi-conducting devices is used as voltage regulator?

A. Zener diode

B. LASER diode

C. Photo diode

D. Solar cell

Answer: A

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14. In metre bridge experiment, with a standard resistance in the right gap and a resistance coil dipped in water (in a beaker) in the left gap, the balancing length obtained is '1'. If the temperature of water is increased, the new balancing

A. > 1

B. < 1

C. $= 0$

D. $= l$

Answer: A

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15. The susceptibility of a ferromagnetic substance is

A. > 1

B. Zero

C. $> \ > 1$

D. < 1

Answer: C

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16. For which combination of working temperatures, the efficiency of 'Carnot's engine' is the least?

A. 40 K, 20 K

B. 60 K, 40 K

C. 100 K, 80 K

D. 80 K, 60 K

Answer: C

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17. The mean energy of a molecule of an ideal gas is

A. kT

B. $\frac{1}{2}kT$

C. $\frac{3}{2}kT$

D. 2 kT

Answer: C

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18. Hydraulic lift works on the basis of

A. Stoke's-slaw

B. Bernoulli s law

C. Toricelli s law

D. Pascal's law

Answer: D

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19. A car moving with a velocity of $20ms^{-1}$ is stopped in a distance of 40 m. If the same car is travelling at double the velocity, the distance travelled by it for same retardation is

A. 640 m

B. 320 m

C. 1280 m

D. 160 m

Answer: D

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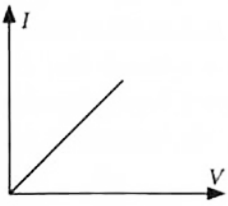
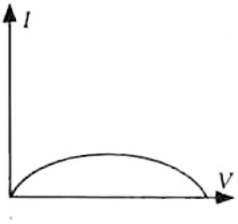
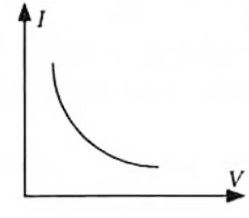
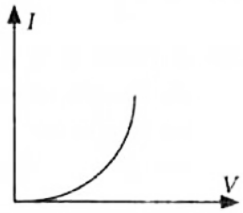
20. Of the following graphs, the one that correctly represents the I-V characteristics of a Ohmic device is

A. 

B. 

C. 

D. 

Answer: A

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21. In a system of two crossed polarisers, it is found that the intensity of light from the second polariser is half from that of first polariser. The angle between their pass axes is

A. 30°

B. 0°

C. 45°

D. 60°

Answer: C

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22. The magnetic field at the center of a current carrying loop of radius 0.1 m is $5\sqrt{5}$ times that at a point along its axis. The distance of this point from the centre of the loop is

A. 0.2 m

B. 0.05 m

C. 0.1 m

D. 0.25m

Answer: A

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23. A proton, at deuteron and an α-particle are projected perpendicular to the direction of a uniform magnetic field with same kinetic energy. The ratio of the radii of the circular paths described by them is

A. $1:\sqrt{2}:\sqrt{2}$

B. $1:\sqrt{2}:1$

C. $\sqrt{2}:\sqrt{2}:1$

D. $\sqrt{2}:1:1$

Answer: B

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24. The angle between velocity and acceleration of a particle describing uniform circular motion is

A. 180°

B. 45°

C. 90°

D. 60°

Answer: C

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25. Two point charges A = +3 nC and B = +1 nC are placed 5 cm apart in air. The work done to move charge B towards A by 1 cm is

A. $2.0 \times 10^{-7} J$

B. $1.35 \times 10^{-7} J$

C. $2.7 \times 10^{-7} J$

D. $12.1 \times 10^{-7} J$

Answer: B

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26. During scattering of light, the amount of scattering is inversely proportional to .....

A. square

B. half

C. cube

D. fourth power

Answer: D

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27. Two simple pendulums A and B are made to oscillate simultaneously and it is found that A completes 10 oscillations in 20 sand B

completes 8 oscillations in 10 s. The ratio of the lengths of A and B is

A. $\frac{5}{4}$

B. $\frac{8}{5}$

C. $\frac{25}{64}$

D. $\frac{64}{25}$

Answer: D

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28. A particle is dropped from a height 'H'. The de Broglie wavelength of the particle depends on height as

A. H

B. $H^{-1/2}$

C. H^{0}

D. $H^{1/2}$

Answer: B

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29. The waves set up in a closed pipe are

A. longitudinal and progressive

B. longitudinal and stationary

C. transverse and stationary

D. transverse and progressive

Answer: B

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30. According to Cartesian sign convention, in ray optics

A. all distances in the direction of incident ray are taken positive

B. all distances are taken negative

C. all distances in the direction of incident ray are taken negative

D. all distances are taken positive

Answer: A

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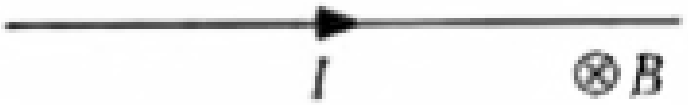
31. A straight wire of length 50 cm carrying a current of 2.5 A is suspended in mid-air by a uniform magnetic field of 0.5 T (as shown in figure). The massof the wire is ($g = 10ms^{-2}$)



A. 100 gm

B. 125 gm

C. 62.5gm

D. 250 gm

Answer: C

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32. A magnetic dipole of magnetic moment $6 \times 10^{-2} Am^2$ and moment of inertia $12 \times 10^{-6} kgm^2$ performs oscillations in a magnetic field of $2 \times 10^{-2} T$. The time taken

by the dipole to complete 20 oscillations is ($\pi = 3$)

A. 6s

B. 12s

C. 36s

D. 18s

Answer: B

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33. The working of magnetic braking of trainsis based on

A. steady current

B. eddy current

C. eddy current

D. pulsatingcurrent

Answer: B

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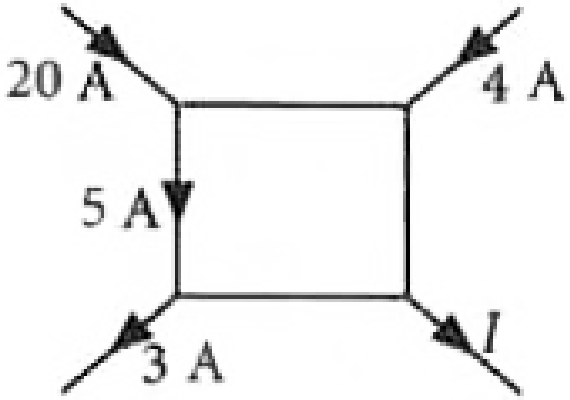
34. The value of I in the figure shown below is



A. 19 A

B. 21A

C. 8A

D. 4A

Answer: B

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35. The output of a stepdown transformer is measured to be 48 V when connected to a 12 W bulb. The value of peak current is

A. $\sqrt{2}A$

B. $\frac{1}{2\sqrt{2}}A$

C. $\frac{1}{4}A$

D. $\frac{1}{\sqrt{2}}A$

Answer: B

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36. A linear objectof height 10 cm is kept in front of a concave mirror of radius of curvature 15 cm, at a distance of 10 cm. The image formed is

A. magnified and erect

B. magnified and inverted

C. diminished and erect

D. diminished and inverted

Answer: B

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37. In a nuclear reactor the function of the Moderator is to decrease

A. number of neutrons

B. speed of neutrons

C. escape of neutrons

D. temperature of the reactor

Answer: B

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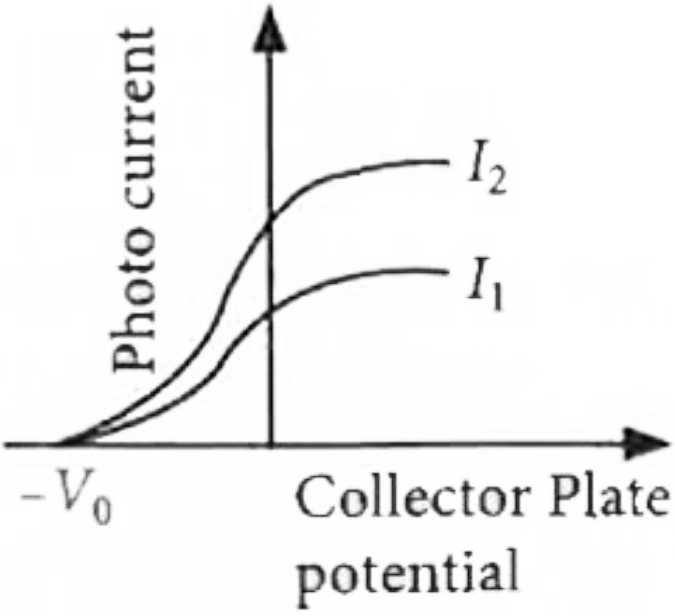
38. From the following graph of photo current against collector plate potential, for two different intensities of light I_1 and I_2, one can

conclude



A. $I_1 = I_2$

B. $I_1 > I_2$

C. $I_1 < I_2$

D. Comparison is not possible

Answer: C

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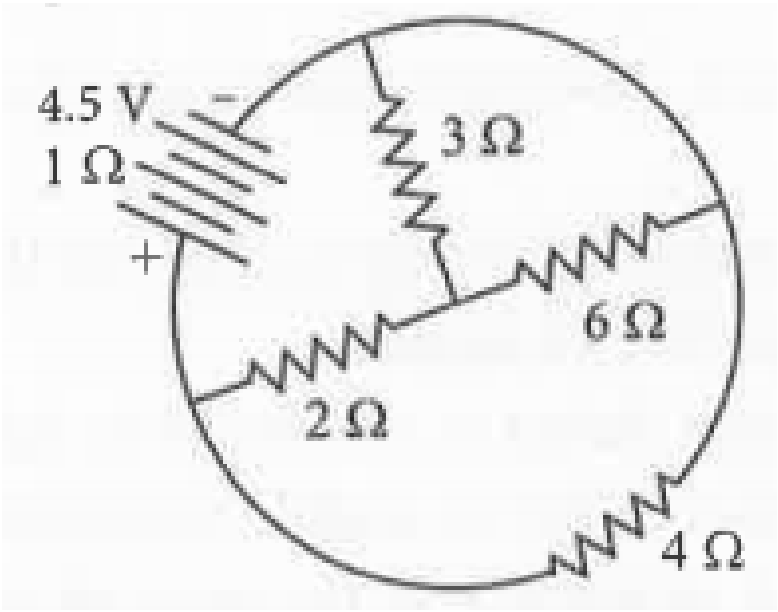
39. The power dissipated in 3Ω resistance in the following circuit is



A. 1 W

B. 0.5 W

C. 0.25 W

D. 0.75 W

Answer: D

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40. A body of mass 50 kg is suspended using aspring balance inside a lift at rest. If the lift

starts falling freely, the reading of the spring balance is

A. 0

B. $< 50kg$

C. 50 kg

D. $> 50kg$

Answer: A

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41. In the three parts of a transistor, 'Emitter' is of

A. moderate size and heavily doped

B. large size and lightly doped

C. thin size and heavily doped

D. large size and moderately doped

Answer: A

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42. A piece of copper is to be shaped into a conducting wire of maximum resistance. The suitable length and diameter are ..... and ..... respectively.

A. L and d

B. 2 L and $d/2$

C. $L/2$ and 2 d

D. 2 L and d

Answer: B

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43. If $\vec{A} = 2\hat{i} + 3\hat{j} + 8\hat{k}$ is perpendicular to $\vec{B} = 4\hat{j} - 4\hat{i} + \alpha\hat{k}$, then the value of α

A. 1

B. $\frac{1}{2}$

C. -1

D. $-\frac{1}{2}$

Answer: D

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44. Which of the following properties is 'False' for a bar magnet?

A. It doesn t produce magnetic held.

B. Its poles cannot be separated.

C. It points in North-South direction when suspended

D. Its like poles repel and unlike poles attract.

Answer: A

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45. The energy gap in case of which of the following is less than 3 eV?

A. Aluminium

B. Iron

C. Germanium

D. Copper

Answer: C

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46. The energy (in W) required to excite an electron from n = 2 to n = 4 state in hydrogen atom

A. $+2.55$

B. -3.4

C. $+4.25$

D. -0.85

Answer: A

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47. According to Huygens' principle, during refraction of light from air to a denser medium

A. wavelength and speed increase

B. wavelength decreases but speed increases

C. wavelength and speed decrease

D. wavelength increases but speed decreases

Answer:

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48. The value of acceleration due to gravity at a depth of 1600 km is equal to [Radius of earth = 6400 km]

A. $9.8ms^{-2}$

B. $4.9ms^{-2}$

C. $7.35ms^{-2}$

D. $19.6ms^{-2}$

Answer: C

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49. A jet plane of wing span 20 m is travelling towards west at a speed of $400ms^{-1}$. If the earth's total magnetic field is 4×10^{-4} T and the dip angle is 30°, at that place, the voltage

difference developed across the ends of the wing is

A. 3.2 V

B. 6.4 V

C. 1.6 V

D. 0.8 V

Answer: C

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50. A cylindrical conductor of diameter 0.1 mm carries a current of 90 mA. The current density(in Am^{-2}) is $\pi = 3$

A. 1.2×10^7

B. 6×10^6

C. 3×10^6

D. 2.4×10^7

Answer: A

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51. Two balls are thrown simultaneously in air. The acceleration of the centre of mass of the two balls when in air,

A. is equal to g (Acceleration due to gravity)

B. depends on the masses of the two balls

C. depends on the direction of motion of the two balls.

D. depends on the speeds of the two balls.

Answer: A

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52. The scientist who is credited with the discovery of 'nucleus' in an atom is

A. Niels Bohr

B. Rutherford

C. J.J.Thomson

D. Balmer

Answer: B

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53. Three point charges of +2q, +2q and -4q are placed at the corners A, B and C of an equilateral triangle ABC of side 'x'. The magnitude of the electric dipole moment of this system is.

A. $2\sqrt{3}qx$

B. 2 qx

C. 3qx

D. $3\sqrt{2}qx$

Answer: A

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54. The mass defect of $_2^4He$ is 0.03 u. The binding energy per nucleon of helium (in MeV) is

A. 69.825

B. 6.9825

C. 2.793

D. 27.93

Answer: B

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55. Young's modulus` is defined as the ratio of

A. bulk stress and longitudinal strain

B. hydraulic stress and hydraulic strain

C. shearing stress and shearing strain

D. tensile stress and longitudinal strain

Answer: D

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56. A motor pump lifts 6 tonnes of water from a well of depth 25 m to the first floor of height 35 m from the ground floor in 20 minutes. The power of the pump (in kW) is $[g = 10ms^{-2}]$

A. 6

B. 1.5

C. 12

D. 3

Answer: D

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57. A substance of mass 49.53 g occupies $1.5cm^3$ of volume. The density of the

substance (in gcm^{-3}) with correct number of significant figures is

A. 3.3

B. 3.302

C. 3.30

D. 3.300

Answer:

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58. A galvanometer of resistance 50 Ω is connected to a battery of 3 V along with a resistance of 2950 Ω in series shows full-scale deflection of 30 divisions. The additional series resistance required to reduce the deflection to 20 divisions is

A. 4440Ω

B. 1500Ω

C. 7400Ω

D. 2950Ω

Answer: B

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59. If $\vec{E}$ and $\vec{B}$ representelectric and magnetic field vectors of an electromagnetic wave, the direction of propagation of the wave is along

A. $\vec{B} \times \vec{E}$

B. $\vec{B}$

C. $\vec{E}$

D. $\overrightarrow{E} \times \overrightarrow{B}$

Answer: D

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60. The minimum value of effective capacitance that can be obtained by combining 3 capacitors of capacitances 1 pF, 2 pF and 4 pF is

A. $\frac{7}{4}pF$

B. $\frac{4}{7}pF$

C. 1 pF

D. 2pF

Answer: B

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