PHYSICS

BOOKS - SUNSTAR PHYSICS (KANNADA ENGLISH)

K-CET_PHYSICS - 2017

Multiple Choice Questions

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

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

A. 3.302

B. 3.300

C. 3.3

D. 3.30

Answer:

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2. 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

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

    A. 45°

    B. 60°

    C. 90°

    D. 180°

Answer: C

4. 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. $\dfrac{1}{2}$

B. $-\dfrac{1}{2}$

C. 1

D. -1

Answer: B

5. 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. $= 50kg$

    B. $> 50kg$

    C. $< 50kg$

    D. $= 0$

Answer: D

6. 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. 3

B. 6

C. 1.5

D. 12

Answer: A

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

    A. depends on the masses of the two balls

    B. depends on the speeds of the two balls

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

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

Answer: C

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8. 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. $19.6ms^{-2}$

D. $7.35m^{-2}$

Answer: D

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

A. tensile stress and longitudinal strain

B. hydraulic stress and hydraulic strain

C. shearing stress and shearing stress and

shearing strain

D. bulk stress and longitudinal strain.

Answer: A

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10. Hydraulic lift works on the basis of

A. Stoke.s Law

B. Toricelli.s Law

C. Pascal.s Law

D. Bernoulli.s Law

Answer: C

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11. The S.I. unit of specific heat capacity is

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

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

C. JK^{-1}

D. Jkg^{-1}

Answer: B

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

A. 60 K, 40 K

B. 40 K, 20 K

C. 80 K, 60 K

D. 100 K, 80 K

Answer: D

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

A. 2KT

B. 3/2 KT

C. KT

D. 1/2 KT

Answer: B

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14. 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. $\dfrac{8}{5}$

B. $\dfrac{64}{25}$

C. $\dfrac{5}{4}$

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

Answer: B

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15. The waves set up in a closed pipe are

A. Transverse and Progressive

B. Longitudinal and Stationary

C. Transverse and Stationary

D. Longitudinal and Progressive

Answer: B

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16. 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. $\dfrac{4d}{3}$

B. $\dfrac{3d}{4}$

C. d

D. $\dfrac{d}{2}$

Answer: B

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17. 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. $2qx$

B. $2\sqrt{3}qx$

C. $3\sqrt{2}qx$

D. 3 qx

Answer: B

18. 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. 5760

    B. 1440

    C. 640

D. Zero

Answer: B

19. 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. $1.35 \times 10^{-7} J$

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

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

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

Answer: A

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20. 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. $10\mu C$ and $30\mu J$

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

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

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

Answer: C

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21. 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. $\dfrac{4}{7}PF$

B. 1 pF

C. $\dfrac{7}{4}pF$

D. 2 pF

Answer: A

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22. 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. 2.4×10^7

    C. 3×10^6

    D. 6×10^6

Answer: A

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23. 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. 2L and d

C. L/2 and 2d

D. 2L and d/2

Answer: D

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

A.

B.

C.

D.

Answer: C

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

A. $8A$

B. 21 A

C. 19 A

D. $4A$

Answer: B

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

A. 0.75 W

B. 0.25 W

C. 1 W

D. 0.5 W

Answer: A

27. 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 .t.. If the temperature of water is increased, the new balancing length is

A. $> l$

B. $< l$

C. $= l$

D. $= 0$

Answer: A

28. 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. $1 : \sqrt{2} : 1$

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

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

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

Answer: A

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29. 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. 1500Ω

B. 4440Ω

C. 7400Ω

D. 2950Ω

Answer: A

30. 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
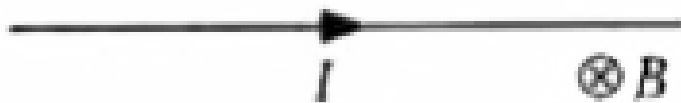
A. 0.2 m

B. 0.1 m

C. 0.05 m

D. 0.25 m

Answer: A

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. 62.5 gm

B. 250 gm

C. 125 gm

D. 100 gm

Answer: A

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

A. Its poles cannot be separated.

B. It points in North - South direction when

suspended.

C. Its like poles repel and unlike poles

attract.

D. It doesn.t produce magnetic field.

Answer: D

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33. 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. 36 s

   B. 6 s

   C. 12 s

   D. 18 s

Answer: C

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34. The susceptibility of a ferromagnetic

substance is

   A. $>\ >1$

   B. >1

   C. <1

   D. Zero

Answer: A

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35. 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. $> g$

C. $< g$

D. Zero

Answer: C

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36. The working of magnetic braking of trainsis

based on

    A. Alternating current

    B. Eddy current

    C. Steady current

D. Pulsating current

Answer: B

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37. A jet plane of wing span 20 m is travelling towards west at a speed of $400 ms^{-1}$. 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. 1.6 V

B. 3.2 V

C. 0.8 V

D. 6.4 V

Answer: A

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38. In the A.C. circuit shown, keeping .K. pressend, if an iron rod is inserted into the

coil, the bulb in the circuit

A. glows more brightly

B. glows less brightly

C. glows with same brightness (as before

the rod is inserted)

D. gets damaged

Answer: B

39. 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. $\dfrac{1}{\sqrt{2}}A$

B. $\sqrt{2}A$

C. $\dfrac{1}{2\sqrt{2}}A$

D. $\dfrac{1}{4}A$

Answer: C

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

A. $\dfrac{1}{300}\,S$

B. $\dfrac{1}{600}\,S$

C. $\dfrac{1}{500}\,S$

D. $\dfrac{1}{200}\,S$

Answer: B

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41. 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. $\vec{E}$

B. $\vec{B}$

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

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

Answer: C

42. According to Cartesian sign convention, in ray optics

    A. all distances are taken positive

    B. all distances are taken negative

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

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

Answer: C

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

A. cube

B. square

C. fourth power

D. half

Answer: C

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

A. wider

B. narrower

C. brighter

D. darker

Answer: B

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

A. wavelength and speed decrease

B. wavelength and speed increase

C. wavelength increases but speed decreases

D. wavelength decreases but speed increases

Answer: A

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47. 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. $45°$

B. $60°$

C. $30°$

D. $0°$

Answer: A

48. 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

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

A. H

B. H°

C. $H^{1/2}$

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

Answer: D

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

    A. J.J. Thomson

    B. Rutherford

    C. Niels Bohr

    D. Balmer

Answer: B

51. 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. -0.85

D. $+4.25$

Answer: A

52. 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

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

to $^{234}_{92}U$

    A. 1α and 2β

    B. 1α only

    C. 1α and 1β

    D. 2α and 2β

Answer: A

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54. The mass defect of $^{4}_{2}He$ is 0.03 u. The binding energy per nucleon of helium (in MeV) is

A. 27.93

B. 6.9825

C. 2.793

D. 69.825

Answer: B

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

A. Copper

B. Iron

C. Aluminimum

D. Germanium

Answer: D

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

A. Photo diode

B. Laser diode

C. Zener diode

D. Solar cell

Answer: C

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

A. moderate size heavily doped

B. large size and lightly doped

C. thin size and heavily doped

D. large size and moderately doped

Answer: A

58. In the figure shown, if the diode forward voltage drop is 0.2 V, the voltage difference between A and B is

A. 1.3 V

B. 2.2 V

C. 0

D. 0.5 V

Answer: B

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

A.

B.

C.

D.

Answer: D

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60. 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. a, b, c, d and e

B. b, a, d, e and c

C. b, d, a, c and e

D. b, e, a, d and c

Answer: B

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