



PHYSICS

BOOKS - SUNSTAR PHYSICS

(KANNADA ENGLISH)

K-CET-PHYSICS - 2016

Mcqs

1. A body falls freely for 10 sec Its average velocity during this journey (take = $10ms^{-2}$)

A. $100ms^{-1}$

B. $10ms^{-1}$

C. $50ms^{-1}$

D. $5ms^{-1}$

Answer: C



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2. Three projectiles A, B and C are projected at an angle of 30° , 60° respectively, If R_A , R_B and R_C are ranges of A, B and C respectively

then (velocity of projection is same for A, B and C

A. $R_A = R_B = R_C$

B. $R_A = R_C > R_B$

C. $R_A < R_B < R_C$

D. $R_A = R_C < R_B$

Answer: D



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3. The component of a vector \vec{r} along x- axis will have a maximum value if

A. \vec{r} is along +ve x - axis

B. \vec{r} is along +ve y - axis

C. \vec{r} is along -ve y - axis

D. \vec{r} makes an angle of 45° with the x - axis

Answer: A



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4. maximum acceleration of the train in which a 50 Kg box lying on its floor will remain stationary (Given : Co-efficient of static friction between the box and the train's floor is 0.3 and $g = 10\text{ms}^{-2}$)

A. 5.0ms^{-2}

B. 3.0ms^{-2}

C. 1.5ms^{-2}

D. 15ms^{-2}

Answer: B



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5. A 12 kg bomb at rest explodes into two pieces of 4 kg and 8kg . If the momentum of 4kg piece is 20Ns, the kinetic energy of the 8kg piece is

A. $25J$

B. $20J$

C. $50J$

D. 40J

Answer: A



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6. Three bodies a ring (R) , a solid cylinder (C) and a solid sphere (S) having same mass and same radius roll down the inclined plane without slipping . They start from rest , if V_R, V_C and V_S are velocities of respective

bodies on reaching the bottom of the plane
then

A. $v_R = v_C = v_S$

B. $v_R > v_C > v_S$

C. $v_R < v_C < v_S$

D. $v_R = v_C > v_S$

Answer: C



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7. Variation of acceleration due to gravity (g) with distance x from the centre of the earth is best represented by ($R \rightarrow$ Radius of the earth)

A. 

B. 

C. 

D. 

Answer: D



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8. A spring is stretched by applying a load to its free end . The strain produced in the spring is

- A. Volumetric
- B. Shear
- C. Longitudinal & Shear
- D. Longitudinal

Answer: C





9. An ideal fluid flows through a pipe of circular cross section with diameters 5 cm and 10 cm as shown. The ratio of velocities of fluid at A and B is



A. 4 : 1

B. 1 : 4

C. 2 : 1

D. 1 : 2

Answer: A



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10. A pan filled with hot food cools from $94^{\circ}C$ to $86^{\circ}C$ in 2 minutes. When the room temperature is $20^{\circ}C$. How long will it cool from $74^{\circ}C$ to $66^{\circ}C$?

A. 2 minutes

B. 2.8 minutes

C. 2.5 minutes

D. 1.8 minutes

Answer: B



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11. Four rods with different radii r and length l are used to connect two heat reservoirs at different temperatures. Which one will conduct most heat ?

A. $r = 1\text{cm}, l = 1\text{m}$

B. $r = 1\text{cm}, l = \frac{1}{2}m$

C. $r = 2\text{cm}, l = 2m$

D. $r = 2\text{cm}, l = \frac{1}{2}m$

Answer: D



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12. A carnot engine working between 300K and 400K has 800 j of useful work . The amount of heat enegy supplied to the engine from the source is

A. 2400 J

B. 3200 J

C. 1200 J

D. 3600 J

Answer: B



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13. A particle executing SHM has maximum speed of 0.5ms^{-1} and maximum acceleration

of 1.0ms^{-2} . The angular frequency of Oscillation is

A. 2 rad s^{-1}

B. 0.5 rad s^{-1}

C. $2\pi \text{ rad s}^{-1}$

D. $0.5\pi \text{ rad s}^{-1}$

Answer: A



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14. A source of sound is moving with a velocity of 50ms^{-1} towards a stationary observer .

The Observer measure the frequency of sound as 500Hz. The appartment frequency of sound

as heard by the observer when source is moving away from hom with the same speed is

(Speed of sound at room temperature 350ms^{-1})

A. 400 Hz

B. 666 Hz

C. 375 Hz

D. 177.5 Hz

Answer: C



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15. If there is only one type of charge in the universe, then $\vec{E} \rightarrow$ Electric field , $\vec{ds} \rightarrow$

Area vector

A. $\oint \vec{E} \cdot \vec{ds} \neq 0$ on any surface

B. $\oint \vec{E} \cdot \vec{ds}$ could not be defined

C. $\oint \vec{E} \cdot d\vec{s} = \infty$ if charge is inside

D. $\oint \vec{E} \cdot d\vec{s} = 0$ if charge is outside, $= \frac{q}{\epsilon_0}$

if charge is inside

Answer:



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16. An electron of mass m , Charge e falls through a distance h meter in a uniform electric field E . Then time of fall

$$\text{A. } t = \sqrt{\frac{2hm}{eE}}$$

$$\text{B. } t = \frac{2hm}{eE}$$

$$\text{C. } t = \sqrt{\frac{2eE}{hm}}$$

$$\text{D. } t = \frac{2eE}{hm}$$

Answer: A



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17. \vec{E}_{ax} and \vec{E}_{eq} represent electric field at a point on the axial and equatorial line of a

dipole . If points are at a distance r from the centre of the dipole , for $r \gg a$

A. $\vec{E}_{ax} = \vec{E}_{eq}$

B. $\vec{E}_{ax} = -\vec{E}_{eq}$

C. $\vec{E}_{ax} = -2\vec{E}_{eq}$

D. $\vec{E}_{eq} = 2\vec{E}_{ax}$

Answer: C



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18. Nature of equipotential surface for a point charge is

A. Ellipsoid with charge at foci

B. Sphere with charge at the centre of the sphere

C. Sphere with charge on the surface of the sphere

D. Plane with charge on the surface

Answer: B



19. A particle of mass 1 gm and charge $1\mu C$ is held at rest on a frictionless horizontal surface at distance 1 m from the fixed charge $2mc$. If the particle is released, it will be repelled. The speed of the particle when it is at a distance of 10m from the fixed charge is

A. $60ms^{-1}$

B. $100ms^{-1}$

C. $90ms^{-1}$

D. 180ms^{-1}

Answer: D



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20. A capacitor of 8 F is connected as shown.

Charge on the plates of the capacitor.



A. 32 C

B. 40 C

C. 0 C

D. 80 C

Answer: A



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21. Four metal plates are arranged as shown.

Capacitance between X and U ($A \rightarrow$ Area of

each plate, $d \rightarrow$ distance between the

plates)



A. $\frac{3}{2} \frac{\epsilon_0 A}{d}$

B. $\frac{2\epsilon_0 A}{d}$

C. $\frac{2}{3} \frac{\epsilon_0 A}{d}$

D. $\frac{3\epsilon_0 A}{d}$

Answer: C



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22. Mobility of free electrons in a conductor is

A. directly proportional to electron density

B. directly proportional to relaxation time

C. inversely proportional to electron density

D. inversely proportional to relaxation time

Answer: B



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23. Variation of resistance of the conductor with temperature is as shown



The temperature co-efficient (α) of the conductor is

A. $\frac{R_0}{m}$

B. mR_0

C. $m^2 R_0$

D. $\frac{m}{R_0}$

Answer: D



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24. Potential difference between A and B in the following circuit



A. 4 V

B. 5.6 V

C. 2.8 V

D. 6 V

Answer: B



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25. In the following network potential at .O.



A. 4 V

B. 3 V

C. 6 V

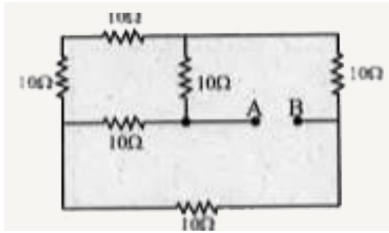
D. 4.8 V

Answer: D



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26. Effective resistance between A and B in the following circuit



A. 10Ω

B. 20Ω

C. 5Ω

D. $20/3\Omega$

Answer: A



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27. Two heating coils of resistance 10Ω and 20Ω are connected in parallel and connected to a battery of emf 12V and internal resistance 1Ω . The power consumed by them are in the ratio

A. 1 : 4

B. 1 : 3

C. 2 : 1

D. 4 : 1

Answer: C



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28. A Proton is projected with a uniform velocity v long the axis of a current carrying solenoid, then

A. the proton will be accelerated along the axis

B. the proton path will be circular about the axis

C. the proton move along helical path

D. the proton will continue to move with
velocity V along the axis

Answer: D



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29. In the cyclotron, as radius of the circular path of the charged particle increases ($\omega =$ angular velocity, $v =$ linear velocity)

- A. both ω and v increases
- B. ω only increases, v remains constant
- C. v increases, ω remains constant
- D. v increases, ω decreases

Answer: C



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30. A conducting wire carrying current is arranged as shown. The magnetic field at .O.



A. $\frac{\mu_0 i}{12} \left[\frac{1}{R_1} - \frac{1}{R_2} \right]$

B. $\frac{\mu_0 i}{12} \left[\frac{1}{R_1} + \frac{1}{R_2} \right]$

C. $\frac{\mu_0 i}{6} \left[\frac{1}{R_1} - \frac{1}{R_2} \right]$

D. $\frac{\mu_0 i}{6} \left[\frac{1}{R_1} + \frac{1}{R_2} \right]$

Answer: A



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31. The quantity of a charge that will be transferred by a current flow of 20 A over 1 hour 30 minutes period is

A. $10.8 \times 10^3 C$

B. $10.8 \times 10^4 C$

C. $5.4 \times 10^3 C$

D. $1.8 \times 10^4 C$

Answer: B



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32. A galvanometer coil has a resistance of 50Ω and the meter shows full scale deflection for a current of 5 mA . This galvanometer is

converted into voltmeter of range 0-20V by connecting

- A. 3950Ω in series with galvanometer
- B. 4050Ω in series with galvanometer
- C. 3950Ω in parallel with galvanometer
- D. 4050Ω in parallel with galvanometer

Answer: A



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33. χ_1 and χ_2 are susceptibility of a paramagnetic material at temperature T_1 K and T_2 K respectively, then

A. $\chi_1 = \chi_2$

B. $\chi_1 T_1 = \chi_2 T_2$

C. $\chi_1 T_2 = \chi_2 T_1$

D. $\chi_1 \sqrt{T_1} = \chi_2 \sqrt{T_2}$

Answer: B



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34. At certain place, the horizontal component of earth's magnetic field is 3.0 G and the angle dip at that place is 30° . The magnetic field of earth at that location

A. 4.5G

B. 5.1G

C. 3.5G

D. 6.0G

Answer: C



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35. The Process of superimposing message signal on high frequency wave is called

- A. Amplification
- B. Demodulation
- C. Transmission
- D. Modulation

Answer: D



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36. A long solenoid with 40 turns per cm carries a current of 1A. The magnetic energy stored per unit volume is _____ J/m^3

A. 3.2π

B. 32π

C. 1.6π

D. 64π

Answer: A



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37. A wheel with 10 spokes each of length L m is rotated with a uniform angular velocity ω in a plane normal to the magnetic field B . The emf induced between the axle and the rim of the wheel

A. $\frac{1}{2}N\omega BL^2$

B. $\frac{1}{2}\omega BL^2$

C. ωbL^2

D. $N\omega BL^2$

Answer: B



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38. The rms value of current in a 50 Hz AC circuit is 6A . The average value of AC current over a cycle is

A. $6\sqrt{2}$

B. $\frac{3}{\pi\sqrt{2}}$

C. Zero

D. $\frac{6}{\pi\sqrt{2}}$

Answer: C



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39. A capacitor of capacitance $10\mu F$ is connected to an AC source and an AC ammeter. If the source voltage varies as $V = 50\sqrt{2} \sin 100t$, the reading of the ammeter is

A. $50mA$

B. $70.7mA$

C. 5.0mA

D. 7.07mA

Answer: A



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40. In a series LCR circuit , the potential drop across L, C and R respectively are 40 V , 120V and 60V . Then the source voltage is

A. 220 V

B. 160 V

C. 180 V

D. 100 V

Answer: D



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41. In a series LCR circuit , and alternating emf (v) and current (i) are given by the equation

$$v = v_0 \sin \omega t, i = i_0 \sin \left(\omega t + \frac{\pi}{3} \right). \quad \text{The}$$

average power dissipated in the circuit over a cycle of AC is

A. $\frac{v_0 i_0}{2}$

B. $\frac{v_0 i_0}{4}$

C. $\frac{\sqrt{3}}{2} v_0 i_0$

D. Zero

Answer: B



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42. Electromagnetic radiation used to sterilise milk is

A. X-ray

B. γ -ray

C. UV rays

D. Radiowaves

Answer: C



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43. A plane glass plate is placed over a various coloured letters (violet , green , yellow , red) .

The letter which appears to raised more is

A. Red

B. Yellow

C. Green

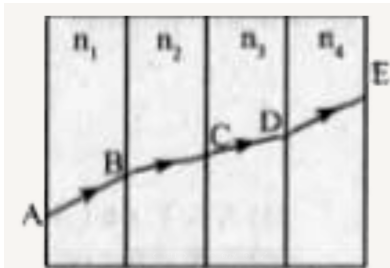
D. Violet

Answer: D



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44. A ray of light passes through four transparent media with refractive index n_1, n_2, n_3 and n_4 as shown. The surface of all media are parallel



If the emergent ray DE is parallel to incident ray AB, then

A. $n_1 = n_4$

B. $n_2 = n_4$

$$C. n_3 = n_4$$

$$D. n_1 = \frac{n_2 + n_3 + n_4}{3}$$

Answer: A



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45. Focal length of a convex lens is 20 cm and its RI is 1.5. it produced an erect , enlarged image if the distance of the object from the lens is

A. 40 cm

B. 30 cm

C. 15 cm

D. 20 cm

Answer: C



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46. A ray of light suffers a minimum deviation when incident on an equilateral prism of refractive index $\sqrt{2}$. The angle of incidence is

A. 30°

B. 45°

C. 60°

D. 50°

Answer: B



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47. In Young's double slit experiment the source is white light. One slit is covered with

red filter and the other with blue filter. There shall be

- A. Alternate red & blue fringes
- B. Alternate drk & pink fringes
- C. Alternate dark & yellow fringes
- D. No interference

Answer: D



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48. Light of wavelength 600nm is incident normally on a slit of width 0.2 mm. The angular width of central maxima in the diffraction pattern is (measured from minimum to minimum)

A. 6×10^{-3} rad

B. 4×10^{-3} rad

C. 2.4×10^{-3} rad

D. 4.5×10^{-3} rad

Answer: A



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49. for what distance is ray optics os good approximation when the aperture is 4 mm and the wavelength of light is 400 nm ?

A. 24 m

B. 40 m

C. 18 m

D. 30 m

Answer: B



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50. The variation of photo-current with collector potential for different frequencies of incident radiation ν_1 , ν_2 and ν_3 is as shown in the graph, then



A. $\nu_1 = \nu_2 = \nu_3$

B. $\nu_1 > \nu_2 > \nu_3$

C. $\nu_1 < \nu_2 < \nu_3$

$$D. v_3 = \frac{v_1 + v_2}{2}$$

Answer: C



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51. The de Broglie wavelength of an electron accelerated to a potential of 400 V is approximately

A. 0.03 nm

B. 0.04 nm

C. 0.12 nm

D. 0.06 nm

Answer: D



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52. Total energy of electron in an excited state of hydrogen atom is $-3.4eV$. The kinetic and potential energy of electron on this state

A. $K = -3.4eV$ $U = -6.8eV$

$$B. K = 3.4eVU = - 6.8eV$$

$$C. K = - 6.8eVU = + 3.4eV$$

$$D. K = + 10.2eVU = - 13.6eV$$

Answer: B



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53. When electron jumps from $n = 4$ level to $n = 1$ level , the angular momentum of electron changes

A. $\frac{h}{2\pi}$

B. $\frac{2h}{2\pi}$

C. $\frac{3h}{2\pi}$

D. $\frac{4h}{2\pi}$

Answer: C



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54. A radio - active sample of half- life 10 days contains 1000 x nuclei . Number of original nuclide present after 5 days is

A. $707x$

B. $750x$

C. $500x$

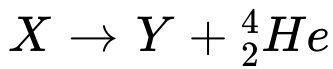
D. $250x$

Answer: A



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55. An element X decays into element Z by two-step process.



- A. X & Z are isobars
- B. X & Y are isotopes
- C. X & Z are isotones
- D. X & Z are isotopes

Answer: D



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56. A nucleus of mass 20 u emits a γ photon of energy 6 MeV . If the emission is assumed to occur when the nucleus is free and at rest then the nucleus will have kinetic energy nearest to
(take $1\text{ u} = 1.6 \times 10^{-27}\text{ Kg}$)

- A. 10 KeV
- B. 1 KeV
- C. 0.1 KeV
- D. 100 KeV

Answer: B



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57. Constant DC voltage is required from a variable AC voltage. Which of the following is correct order of operation ?

- A. Regulator, filter, rectifier
- B. Rectifier, regulator, filter
- C. Rectifier, filter, regulator
- D. Filter, regulator, rectifier

Answer: C



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58. In a transistor , the collector current varies by 0.49mA and emitter current varies by 0.50mA current gain β measured is

A. 49

B. 150

C. 99

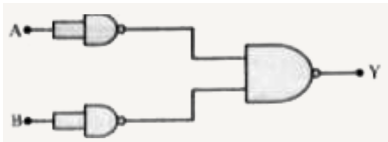
D. 100

Answer: A



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59. Identify the logic operation carried out by the following circuit.



A. AND

B. NAND

C. NOR

D. OR

Answer: D



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