



PHYSICS

BOOKS - SUNSTAR PHYSICS

(KANNADA ENGLISH)

K-CET-PHYSICS-2015

Multiple Choice Questions

1. Core of electromagnets are made of ferromagnetic material which has

- A. Low permeability and low retentivity
- B. Low permeability and high retentivity
- C. High permeability and high retentivity
- D. High permeability and low retentivity

Answer: D



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2. If there is no torsion in the suspension thread, then the time period of a magnet executing SHM is

$$\text{A. } T = 2\pi \sqrt{\frac{MB}{I}}$$

$$\text{B. } T = 2\pi \sqrt{\frac{I}{MB}}$$

$$\text{C. } T = \frac{1}{2\pi} \sqrt{\frac{I}{MB}}$$

$$\text{D. } T = \frac{1}{2\pi} \sqrt{\frac{M}{I}}$$

Answer: B



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3. Two parallel wires 1 m apart carry currents of 1 A and 3 A respectively in opposite

directions. The force per unit length acting between these two wires is

A. $6 \times 10^{-5} \text{ Nm}^{-1}$ attractive

B. $6 \times 10^{-5} \text{ Nm}^{-1}$ repulsive

C. $6 \times 10^{-7} \text{ Nm}^{-1}$ attractive

D. $6 \times 10^{-7} \text{ Nm}^{-1}$ repulsive

Answer: D



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4. A galvanometer of resistance 50Ω gives a full scale deflection for a current $5 \times 10^{-4} A$.

A. The resistance that should be connected in series with the galvanometer to read 3 V is

A. 5950Ω

B. 5059Ω

C. 5050Ω

D. 595Ω

Answer: A



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5. A cyclotron is used to accelerate

- A. both positively and negatively charged particles
- B. only negative charged particles
- C. only positively charged particles
- D. neutron

Answer: A



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6. A transformer is used to light 100 W - 110 lamp from 220 V mains. If the main current is 0.5 A, the efficiency of the transformer is

A. 0.9

B. 0.96

C. 0.95

D. 0.9

Answer: D



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7. In an LCR circuit, at resonance

- A. the current leads the voltage by $\pi / 2$
- B. the current is minimum
- C. the impedance is maximum
- D. the current and voltage are in phase

Answer: D



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8. An aircraft with a wingspan of 40 m flies with a speed of 1080 km/hr in the eastward direction at a constant altitude in the northern hemisphere, where the vertical component of the earth's magnetic field 1.75×10^{-5} . Then the emf developed between the tips of the wings is

A. 2.1V

B. 0.21V

C. 0.34V

D. 0.5V

Answer: B



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9. Two coils have a mutual inductance 0.005 H . The current changes in the first coil according to the equation where A and The maximum value of the emf induced in the second coil is

A. 2π

B. π

C. 5π

D. 2π

Answer: C



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10. The magnetic susceptibility of a paramagnetic material at is 0.0075 and its value at will be

A. 0.0075

B. 0.015

C. 0.0030

D. 0.0045

Answer: B



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11. In a Young's double slit experiment the slit separation is 0.5m from the slits. For a monochromatic light of wavelength 500nm, the distance of 3rd maxima from 2nd minima on the other side is

A. 2.25mm

B. 22.5mm

C. 2.5mm

D. 2.75mm

Answer:



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12. Calculate the focal length of a reading glass of a person if his distance of distinct vision is 75 cm.

A. 100.4cm

B. 75.2cm

C. 37.5cm

D. 25.6cm

Answer: C



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13. A person wants a real image of his own, 3 times enlarged. Where should he stand in front

of a concave mirror of radius of curvature 30 cm?

A. 20cm

B. 90cm

C. 30cm

D. 10cm

Answer: A



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14. If ϵ_0 and μ_0 are the permittivity and permeability of free space and are the corresponding quantities for a medium, then refractive index of the medium is

A. Insufficient information

B. 1

C. $\sqrt{\frac{\mu\epsilon}{\mu_0\epsilon_0}}$

D. $\sqrt{\frac{\mu_0\epsilon_0}{\mu\epsilon}}$

Answer: C



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15. The average power dissipated in a pure inductor

A. zero

B. $\frac{VI^2}{4}$

C. VI^2

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

Answer: A



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16. An particle of energy 5 MeV is scattered through 180° by gold nucleus. The distance of closest approach is of the order of

A. 10^{-16} cm

B. 10^{-14} cm

C. 10^{-12} cm

D. 10^{-10} cm

Answer: C



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17. Find the de-Broglie wavelength of an electron with kinetic energy of 120 eV.

A. 124pm

B. 112pm

C. 102pm

D. 95pm

Answer: B



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18. Light of two different frequencies whose photons have energies 1 eV and 2.5 eV respectively, successively illuminate a metallic surface whose work function is 0.5 eV. Ratio of maximum speeds of emitted electrons will be

A. 1 : 1

B. 1 : 2

C. 1 : 4

D. 1 : 5

Answer: B



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19. The polarizing angle of glass is 57° . A ray of light which is incident at this angle will have an angle of refraction as

A. 38°

B. 43°

C. 33°

D. 25°

Answer: C



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20. To observe diffraction, the size of the obstacle

A. should be of the order of wavelength

B. should be much larger than the wavelength

C. should be $\lambda/2$, where λ is the wavelength

D. has no relation to wavelength

Answer: A



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21. A radioactive decay can form an isotope of the original nucleus with the emission of particles

A. four α and one β

B. one α and one β

C. one α and two β

D. one α and four β

Answer: C



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22. The half life of a radioactive substance is 20 minutes. The time taken between 50% decay and 87.5% decay of the substance will be

- A. 10 minutes
- B. 25 minutes
- C. 40 minutes
- D. 30 minutes

Answer: C



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23. A nucleus at rest splits into two nuclear parts having radii in the ratio 1 : 2. Their velocities are in the ratio

A. 2 : 1

B. 4 : 1

C. 6 : 1

D. 8 : 1

Answer: D



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24. What is the wavelength of light for the least energetic photon emitted in the Lyman series of the hydrogen spectrum?

A. 150nm

B. 122nm

C. 102nm

D. 82nm

Answer: B



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25. If an electron in hydrogen atom jumps from an orbit of level $n = 3$ to an orbit of level $n = 2$, the emitted radiation has a frequency

A. $\frac{5RC}{36}$

B. $\frac{8RC}{9}$

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

D. $\frac{3RC}{27}$

Answer: A



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26. The circuit has two oppositely connected ideal diodes in parallel. What is the current flowing in the circuit?



A. 1.33A

B. 2.31A

C. 2.0A

D. 1.71A

Answer: D



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27. Amplitude modulation has

- A. one carrier with high frequency
- B. one carrier with infinite frequencies
- C. one carrier

D. one carrier with two side band frequencies

Answer: D



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28. An LED is constructed from a pn junction based on a certain semi-conducting material whose energy gap is 1.9 eV. Then the wavelength of the emitted light is

A. $9.1 \times 10^{-5}m$

B. $6.5 \times 10^{-7}m$

C. $1.6 \times 10^{-8}m$

D. $2.9 \times 10^{-9}m$

Answer: B



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29. The waves used for the line - of - sight
(LOS) communication is

A. sky waves

B. sound waves

C. space waves

D. ground waves

Answer: C



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30. The given truth table is for

Input		Output
A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

A. NOR gate

B. NAND gate

C. OR gate

D. AND gate

Answer: B



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31. The input characteristics of a transistor in CE mode is the graph obtained by plotting

- A. I_B against I_C at constant V_{BE}
- B. I_B against I_C at constant V_{CE}
- C. I_B against V_{CE} at constant V_{BE}
- D. I_B against V_{BE} at constant V_{CE}

Answer: D



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32. A particle is projected with a velocity v so that its horizontal range is twice the greatest height attained. The horizontal range is

A. $\frac{v^2}{2g}$

B. $\frac{4v^2}{5g}$

C. $\frac{2v^2}{3g}$

D. $\frac{v^2}{g}$

Answer: D



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33. The velocity -time graph for two bodies A and B shown. Then the acceleration of A and B are in the ratio



A. $\cos 25^\circ$ to $\cos 50^\circ$

B. $\sin 25^\circ$ to $\sin 50^\circ$

C. $\tan 25^\circ$ to $\tan 50^\circ$

D. $\tan 25^\circ$ to $\tan 40^\circ$

Answer: C



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34. The ratio of the dimensions of Planck constant and that of moment of inertia has the dimensions of

- A. velocity
- B. angular momentum
- C. frequency
- D. time

Answer: C



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35. Moment of inertia of a thin uniform rod rotating about the perpendicular axis passing through its center is I . If the same rod is bent into a ring and its moment of inertia about its diameter is

A. $5/3\pi^2$

B. $2/3\pi^2$

C. $8/3\pi^2$

D. $3/2\pi^2$

Answer: B



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36. If the mass of a body is M on the surface of the earth, the mass of the same body on the surface of the moon is

A. zero

B. $6M$

C. M

D. $M/6$

Answer: C



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37. The ratio of angular speed of a second-hand to the hour-hand of a watch is

A. 72 : 1

B. 3600 : 1

C. 60 : 1

D. 720 : 1

Answer: D



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38. The kinetic energy of a body of mass 4 kg and momentum 6 N s will be

A. 5.5J

B. 4.5J

C. 3.5J

D. 2.5J

Answer: B



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39. A stone of mass 0.05 kg is thrown vertically upwards. What is the direction and magnitude of net force on the stone during its upward motion?

- A. 9.8 N vertically downwards
- B. 0.98 N vertically downwards
- C. 0.49 N vertically downwards

D. 0.49N vertically downwards

Answer: C



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40. The ratio of kinetic energy to the potential energy of a particle executing SHM at a distance equal to half its amplitude, the distance being measured from its equilibrium position is

A. 8:1

B. 2: 1

C. 4: 1

D. 3: 1

Answer: D



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41. 1 gram of ice is mixed with 1 gram of steam.

At thermal equilibrium, the temperature of the

mixture is

A. $55^{\circ} C$

B. $50^{\circ} C$

C. $100^{\circ} C$

D. $0^{\circ} C$

Answer: C



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42. What is heated from $0^{\circ}C$ to $10^{\circ}C$, then its volume

A. first decreases and then increases

B. does not change

C. increases

D. decreases

Answer: A



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43. The efficiency of a Carnot engine which operates between the two temperatures

$T_1 = 500K$ and $T_2 = 300K$ is

A. 0.4

B. 0.75

C. 0.25

D. 0.5

Answer: A



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44. The ratio of hydraulic stress to the corresponding strain is known as

A. Rigidity modulus

B. Young's modulus

C. Bulk modulus

D. Compressibility

Answer: C



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45. The angle between the dipole moment and electric field at any point on the equatorial plane is

A. 45°

B. 180°

C. 90°

D. 0°

Answer: B



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46. Pick out the statement which is incorrect

A. Field lines never intersect

B. A negative test charge experiences a force opposite to the direction of the field

C. The electric field forms closed loop

D. The tangent drawn to a line of force represents the direction of electric field

Answer: C



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47. Two spheres carrying charges $+6\mu C$ and $9\mu C$, separated by a distance d , experience a force of repulsion F . When a charge of $-3\mu C$ is given to both the sphere and kept at the same distance as before, the new force of repulsion is

A. $F/9$

B. $F/3$

C. $3F$

D. F

Answer: B



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48. A stretched string is vibrating in the second overtone, then the number of nodes and antinodes between the ends of the string are respectively

A. 2 and 3

B. 3 and 4

C. 3 and 2

D. 4 and 3

Answer: D



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49. When two tuning forks A and B are sounded together, 4 beats per second are heard. The frequency of the fork B is 384 Hz. When one of the prongs of the fork A is filed and sounded with B, the beat frequency increases, then the frequency of the fork A is

A. 389Hz

B. 379Hz

C. 388Hz

D. 380Hz

Answer: C



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50. Three resistances 2Ω , 3Ω and 4Ω are connected in parallel . The ratio of currents

passing through them when a potential differences is applied across its ends will be

A. 4 : 3 : 2

B. 5 : 4 : 3

C. 6 : 4 : 3

D. 6 : 3 : 2

Answer: C



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51. Four identical cells of emf E and internal resistance r are to be connected in series. Suppose if one of the cell is connected wrongly, the equivalent emf and effective internal resistance of the combination is

- A. $2E$ and $2r$
- B. $2E$ and $4r$
- C. $4E$ and $2r$
- D. $4E$ and $4r$

Answer: B



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52. A parallel plate capacitor is charged and then isolated . The effect if increasing the plate separation on charge , potential and capacitance respectively are

- A. constant, increase, decrease
- B. constant, decrease, increase
- C. increases, decreases, decreases
- D. constant, decreases, decreases

Answer: A



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53. A spherical shell of radius 10 cm is carrying a charge q . If the electric potential at distances of the spherical shell is V_1 , V_2 and V_3 respectively, then

A. $V_1 = V_2 < V_3$

B. $V_1 = V_2 > V_3$

C. $V_1 < V_2 < V_3$

$$D. V_1 > V_2 > V_3$$

Answer: B



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54. Three point charges 3 nC , 6 nC and 9 nC are placed at the corners of an equilateral triangle of side 0.1 m . The potential energy of the system is

A. 8910J

B. 89100J

C. 9910J

D. 99100J

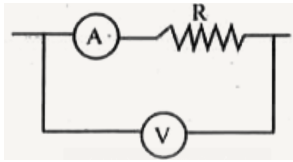
Answer:



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55. In the circuit shown below, the ammeter and the voltmeter readings are 3A and 6V respectively, Then the value of the resistance R

is



A. $\geq 2\Omega$

B. $< 2\Omega$

C. $> 2\Omega$

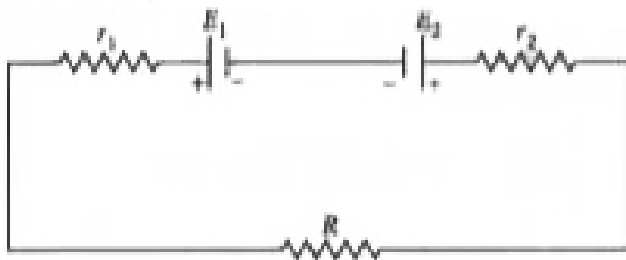
D. 2Ω

Answer: B



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56. Two cells of emf E_1 and E_2 are joined in opposition (such that $E_1 > E_2$). If r_1 and r_2 be the internal resistance and R be the external resistance , then the terminal potential difference is



A. $\frac{E_1 - E_2}{r_1 + r_2 + R} \times R$

B. $\frac{E_1 - E_2}{r_1 + r_2} \times R$

C. $\frac{E_1 - E_2}{r_1 + r_2 + R} \times R$

D. $\frac{E_1 + E_2}{r_1 + r_2} \times R$

Answer: A



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57. A proton beam enters a magnetic field of $10^{-4} \text{ Wb m}^{-2}$ normally. If the specific charge of the proton is $10^{11} \text{ C kg}^{-1}$ and its velocity is 10^9 m s^{-1} then the radius of the circle described will be

A. 1m

B. 100m

C. 10m

D. 0.1m

Answer: B



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58. Two concentric coils each of radius equal to 2π cm are placed right angles to each other. If 3 A and 4 A are the currents flowing through the two coils respectively. The magnetic

induction (in Wbm^{-2}) at the center of the coils will be

A. 7×10^{-5}

B. 5×10^{-5}

C. 10^{-5}

D. 12×10^{-5}

Answer: B



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59. The resistance of the bulb filament is $100\ \Omega$ at a temperature of 100°C . If its temperature coefficient of resistance be $0.005\text{ per }^\circ\text{C}$, its resistance will become $200\ \Omega$ at a temperature

A. 200°C

B. 500°C

C. 400°C

D. 300°C

Answer: C



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60. In Wheatstone's network $P = 2\Omega$, $Q = 2\Omega$, $R = 2\Omega$ and $S = 3\Omega$. The resistance with which S is to be shunted in order that the bridge may be balanced is

- A. 6Ω
- B. 4Ω
- C. 2Ω
- D. 1Ω

Answer: A



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