

PHYSICS

BOOKS - KCET PREVIOUS YEAR PAPERS

KARNATAKA CET 2015

Physics

1. 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. 10 m

B. 1 m

C. 0.1 m

D. 100 m

Answer: D



Watch Video Solution

2. 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. 10^{-5}

B. 7×10^{-5}

C. 12×10^{-5}

D. 5×10^{-5}

Answer: D



Watch Video Solution

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

A. $400^\circ C$

B. $200^\circ C$

C. $300^\circ C$

D. $500^{\circ}C$

Answer: A



Watch Video Solution

4. 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. 2Ω

B. 6Ω

C. 1Ω

D. 4Ω

Answer: B



Watch Video Solution

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

A. high permeability and high retentivity

B. low permeability and low retentivity

C. high permeability and low retentivity

D. low permeability and high retentivity

Answer: C



Watch Video Solution

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

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

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

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

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

Answer: D



Watch Video Solution

7. 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. $6 \times 10^{-7} \text{ N m}^{-1}$ attractive

B. $6 \times 10^{-5} \text{ N m}^{-1}$ attractive

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

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

Answer: C



Watch Video Solution

8. 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. 5050Ω

B. 5950Ω

C. 595Ω

D. 5059Ω

Answer: B



Watch Video Solution

9. A cyclotron is used to accelerate

A. only positively charged particles

B. both positively and negatively charged particles

C. neutron

D. only negatively charged particles

Answer: B



Watch Video Solution

10. 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. 0.95

B. 0.99

C. 0.9

D. 0.96

Answer: C



Watch Video Solution

11. In an LCR circuit, at resonance

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

Answer: C



Watch Video Solution

12. 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. 0.34V

B. 2.1V

C. 0.5V

D. 0.21 V

Answer: D



Watch Video Solution

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

A. 5π

B. 4π

C. 2π

D. π

Answer: A



Watch Video Solution

14. The magnetic susceptibility of a paramagnetic material at -73°C is 0.0075 , its value at -173°C will be

A. 0.0030

B. 0.0075

C. 0.0045

D. 0.015

Answer: D



Watch Video Solution

15. 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. 2.5 mm

B. 2.25mm

C. 2.75 mm

D. 22.5 mm

Answer:



Watch Video Solution

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

A. 37.5mm

B. 100.4 cm

C. 25.6 cm

D. 75.2 cm

Answer: A



Watch Video Solution

17. 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. 30 cm

B. 20 cm

C. 10 cm

D. 90 cm

Answer: B



Watch Video Solution

18. 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. $\sqrt{\frac{\mu_\epsilon}{\mu_0\epsilon_0}}$

B. insufficient information

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

D. 1

Answer: A



Watch Video Solution

19. The average power dissipated in a pure inductor

A. VI^2

B. zero

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

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

Answer: B



Watch Video Solution

20. 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^{-12} cm

B. 10^{-16} cm

C. 10^{-10} cm

D. 10^{-14} cm

Answer: A



Watch Video Solution

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

A. 102 pm

B. 124 pm

C. 95 pm

D. 112 pm

Answer: D



Watch Video Solution

22. 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 : 4

B. 1 : 1

C. 1:5

D. 1:2

Answer: D



Watch Video Solution

23. 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. 33°

B. 38°

C. 25°

D. 43°

Answer: A



Watch Video Solution

24. To observe diffraction, the size of the obstacle

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

B. should be of the order of wavelength

C. has no relation to wavelength

D. should be much larger than the wavelength

Answer: B



Watch Video Solution

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

A. one α and two β

B. four α and one β

C. one α and four β

D. one α and one β

Answer: A



Watch Video Solution

26. 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. 40 minutes

B. 10 minutes

C. 30 minutes

D. 25 minutes

Answer: A



Watch Video Solution

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

A. 6 : 1

B. 2 : 1

C. 8 : 1

D. 4 : 1

Answer: C



Watch Video Solution

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

A. 102 nm

B. 150 nm

C. 82 nm

D. 122 nm

Answer: D



Watch Video Solution

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

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

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

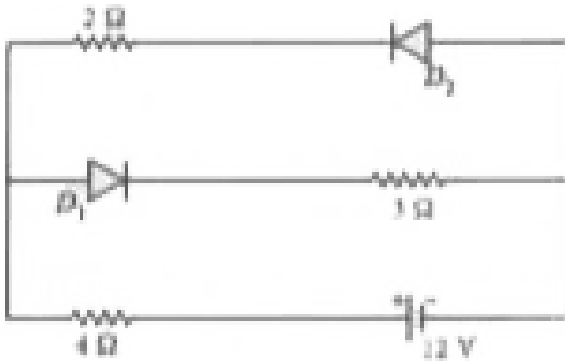
D. $\frac{8RC}{9}$

Answer: B



Watch Video Solution

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



- A. 2.0 A
- B. 1.33 A
- C. 1.71 A
- D. 2.31A

Answer: C



Watch Video Solution

31. Amplitude modulation has

A. one carrier

B. one carrier with high frequency

C. one carrier with two side band
frequencies

D. one carrier with infinite frequencies

Answer: C



Watch Video Solution

32. 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. $1.6 \times 10^{-8} \text{ m}$

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

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

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

Answer: D



Watch Video Solution

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

A. space waves

B. sky waves

C. ground waves

D. sound waves

Answer: A



Watch Video Solution

34. The truth table given below is for

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

(A and B are the inputs, Y is the output)

A. OR gate

B. NOR gate

C. AND gate

D. NAND gate

Answer: D



Watch Video Solution

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

A. I_B against V_{CE} at constant V_{BE}

B. I_B against I_C at constant V_{BE}

C. I_B against V_{BE} at constant V_E

D. I_B against I_C at constant V_{CE}

Answer: C



Watch Video Solution

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

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

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

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

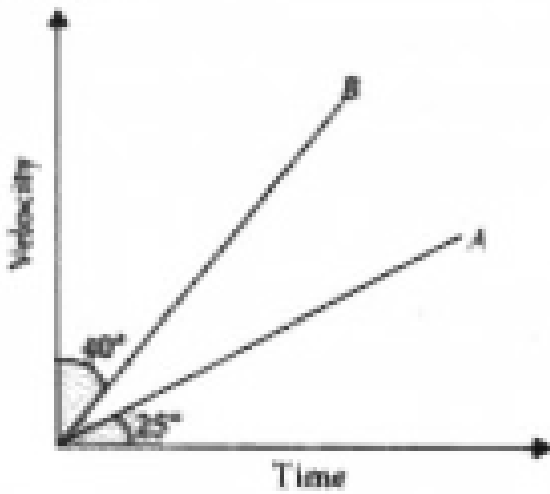
D. $\frac{4v^2}{5g}$

Answer: C



Watch Video Solution

37. The velocity - time graph for two bodies A and B are in the ratio



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

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

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

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

Answer: A



Watch Video Solution

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

A. frequency

B. velocity

C. time

D. angular momentum

Answer: A



39. 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. $\frac{8}{3}\pi^2$

B. $\frac{5}{3}\pi^2$

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

D. $\frac{2}{3}\pi^2$

Answer: D



Watch Video Solution

40. 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. M

B. zero

C. $\frac{M}{6}$

D. $6M$

Answer: A



Watch Video Solution

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

A. $60:1$

B. $72:1$

C. $720:1$

D. $3600:1$

Answer: C



Watch Video Solution

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

A. 3.5 J

B. 5.5J

C. 2.5J

D. 4.5J

Answer: D



Watch Video Solution

43. 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. 0.49 N vertically downwards

B. 9.8 N vertically downward

C. 0.49 N vertically upwards

D. 0.98 N vertically downwards

Answer: A



Watch Video Solution

44. 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. 4: 1

B. 8 : 1

C. 3 : 1

D. 2 : 1

Answer: C



Watch Video Solution

45. 1 gram of ice is mixed with 1 gram of steam.

At thermal equilibrium, the temperature of the

mixture is

A. $100^{\circ}C$

B. $55^{\circ}C$

C. $0^{\circ}C$

D. $50^{\circ}C$

Answer: A



Watch Video Solution

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

A. increases

B. first decreases and then increases

C. decreases

D. does not change

Answer: B



Watch Video Solution

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

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

A. 0.25

B. 0.4

C. 0.5

D. 0.75

Answer: B



Watch Video Solution

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

A. Bulk modulus

B. Rigidity modulus

C. Compressibility

D. Young's modulus

Answer: A



Watch Video Solution

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

A. 90°

B. 45°

C. 0°

D. 180°

Answer: D



Watch Video Solution

50. Pick out the statement which is incorrect

A. The electric field lines forms closed loop .

B. Field lines never intersect

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

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

Answer: A



Watch Video Solution

51. 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 spheres and kept at the same distance as before, the new force of repulsion is

A. $3F$

B. $\frac{F}{9}$

C. F

D. $\frac{F}{3}$

Answer: D



Watch Video Solution

52. 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. 3 and 2

B. 2 and 3

C. 4 and 3

D. 3 and 4

Answer: C



Watch Video Solution

53. 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. 388 Hz

B. 389 Hz

C. 380 Hz

D. 379 Hz

Answer: A



Watch Video Solution

54. 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. 6: 4: 3

B. 4: 3: 2

C. 6: 3: 2

D. 5: 4: 3

Answer: A



Watch Video Solution

55. 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. $4E$ and $2r$

B. $2E$ and $2r$

C. $4E$ and $4r$

D. $2E$ and $4r$

Answer: D



Watch Video Solution

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

A. increases , decreases , decreases

B. constant , increases , decreases

C. constant , decreases , decreases

D. constant , decreases , increases

Answer: B



Watch Video Solution

57. A spherical shell of radius 10 cm is carrying a charge q . If the electric potential at distances 5cm, 10cm & 15cm from the centre 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: D



Watch Video Solution

58. 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. 89100 J

B. 99100 J

C. 8910 J

D. 9910 J

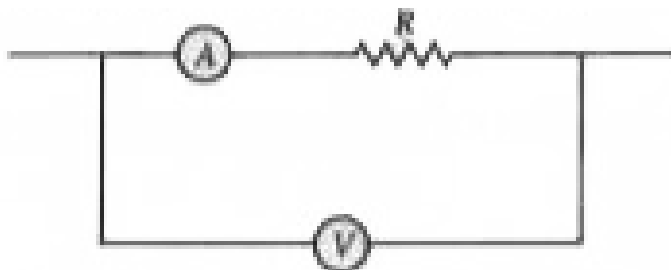
Answer:



Watch Video Solution

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

R is



A. $> 2\Omega$

B. $\geq 2\Omega$

C. 2Ω

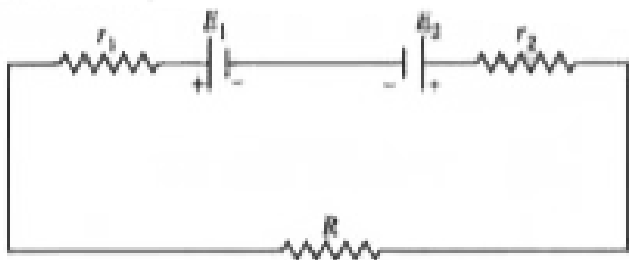
D. $< 2\Omega$

Answer: D



Watch Video Solution

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

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

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

Answer: B



Watch Video Solution