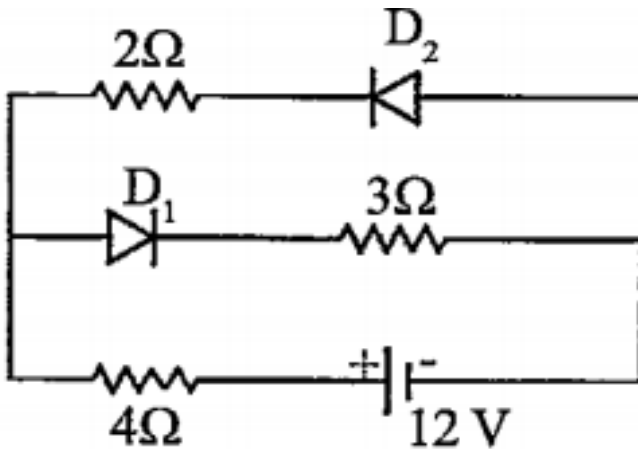# PHYSICS

BOOKS - SARAS PUBLICATION

MODEL QUESTION PAPER 5

Exercise

1. The circuit has two oppositely connected ideal diodes in parallel. What is the current

flowing in the circuit ?

A. 2.31A

B. 1.71 A

C. 1.33 A

D. 2.0 A

Answer:

2. Amplitude modulation has:

A. one carrier with infinite frequencies

B. one carrier with infinite frequencies

C. one carrier with high frequency

D. one carrier

Answer:

3. An LED is constructed from 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. $6.5 \times 10^{-7}m$

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

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

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

Answer:

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4. The waves used for Line-of Sight (LOS) communication is:

    A. sound waves

    B. ground waves

    C. sky waves

    D. space waves

Answer:

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5. The given truth table is for:

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

A. NAND gate

B. AND gate

C. NOR gate

D. OR gate

Answer:

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

    A. lb against $V_C E$ at constant $V_C E$

    B. I_B against $V_B E$ at constant $V_C E$

    C. I_B against I_c at constant $V_B E$

    D. I_B against $V_C E$ at constant $V_B E$

Answer:

7. A particle is projected at such an angle that the horizontal range is three times the greates height attained. For this situation which one of the following statements is correct ?

A. $\dfrac{4v^2}{5g}$

B. $\dfrac{4v^2}{g}$
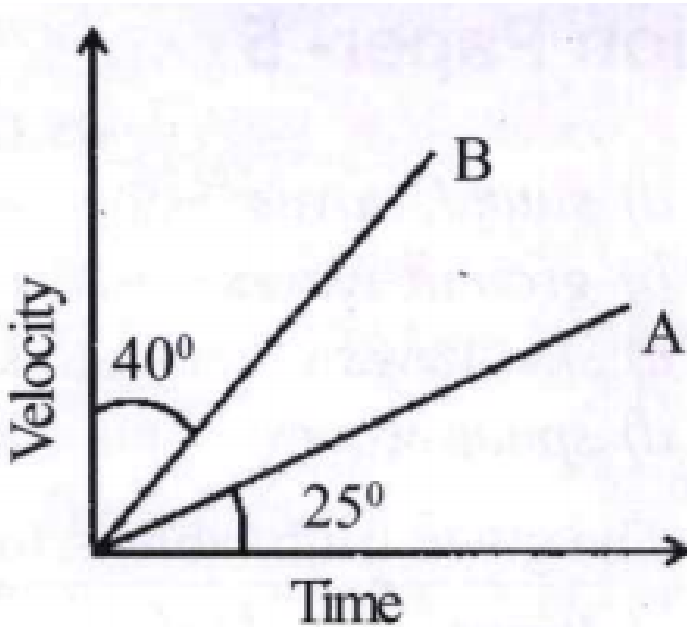
C. $\dfrac{v^2}{2g}$

D. $\dfrac{2v^2}{3g}$

Answer:

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8. The velocity-time graph for two bodies Aand

B are shown in figure. Then, the acceleration of

A and B are in the ratio:

A. $\sin 25° \rightarrow \sin 50°$

B. $\tan 25° \rightarrow \tan 40°$

C. $\cos 25° \rightarrow \cos 50°$

D. $\tan 25° \rightarrow \tan 50°$

Answer:

9. The ratio of the dimension of planck constant and that of moment of inertia is the dimension of ....

A. angular momentum

B. time

C. velocity

D. frequency

Answer:

10. Moment of inertia of a thin uniform rod rotating about the perpendicular axis passing through its centre is I. If the same rod is bent into a ring and its moment of inertia about its diameter is I', then the ratio I/I' is,

A. $\dfrac{2}{3}\pi^2$

B. $\dfrac{3}{2}\pi^2$

C. $\dfrac{5}{3}\pi^2$

D. $\dfrac{8}{3}\pi^2$

Answer:

11. 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. 6M

B. $M/6$

C. zero

D. M

Answer:

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

A. $3600:1$

B. $720 : 1$

C. $72 : 1$

D. $60 : 1$

Answer:

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

A. 4.5 J

B. 2.5 J

C. 5.5 J

D. 3.5 J

Answer:

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14. 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. 0.98 N vertically downwards

B. 0.49 N vertically downwards

C. 9.8 N vertically downwards

D. 0.49 N vertically upwards

Answer:

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15. 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. $2:1$

B. $3:1$

C. $8:1$

D. $4:1$

Answer:

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16. 1 g of ice is mixed with 1 g of steam. At thermal equilibrium, the temperature of the mixture is

A. $50°C$

B. $0°C$

C. $55°C$

D. $100°C$

Answer:

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17. When water is heated from $0°C$ to $10°C$, its volume ....

  A. does not change

  B. decreases

  C. decreases and then it increases

  D. increases

Answer:

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18. The efficiency of a Carnot engine which operate between the two temperatures $T_1 : 500K$ and $T_2 = 300K$ is :

A. 75%

B. 50%

C. 40%

D. 25%

Answer:

19. The ratio of hydraulic stress to, the corresponding strain is known as:

A. Young's modulus

B. compressibility

C. rigidity modulus

D. bulk modulus

Answer:

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

    A. $180°$

    B. $0°$

    C. $45°$

    D. $90°$

Answer:

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21. Pick out the statement which is incorrect?

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

B. The tangent drawn to a line of force represents the di   rect of electric field

C. Field lines never intersect

D. The electric field lines forms closed loop

Answer:

22. Two spheres carrying charges $+6\mu C$ and $+9\mu C$,separated by distance d, experiences 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. $\dfrac{F}{3}$

B. F

C. $\dfrac{F}{3}$

D. 3F

Answer:

23. 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 4

B. 4 and 3

C. 2 and 3

D. 3 and 2

Answer:

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24. 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 filled

and sounded with B, the beat frequency increases, then the frequency of the fork A is:

A. 379 Hz

B. 380 Hz

C. 389 Hz

D. 388Hz

Answer:

25. Three resistance 2Ω, 3Ω and 4Ω are connected in parallel. The ratio of currents passing through them when a potential difference is applied across its ends will be:

A. $5:4:3$

B. $6:3:2$

C. $4:3:2$

D. $6:4:3$

Answer:

26. 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 4r

B. 4E and 4r

C. 2E and 4r

D. 4E and 2r

Answer:

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

A. constant, decreases, increases

B. constant, decreases, decreases

C. constant, increases, decreases

D. increases, decreases, decreases

Answer:

28. A spherical shell, of radius 10 cm is carrying a charge g. If the electric potential at distance 5cm, 10 cm and 15 cm from the centre of the spherical shell is V_1, V_2 and V_3 respectively, then:

A. $V_1 = V_2 > V_3$

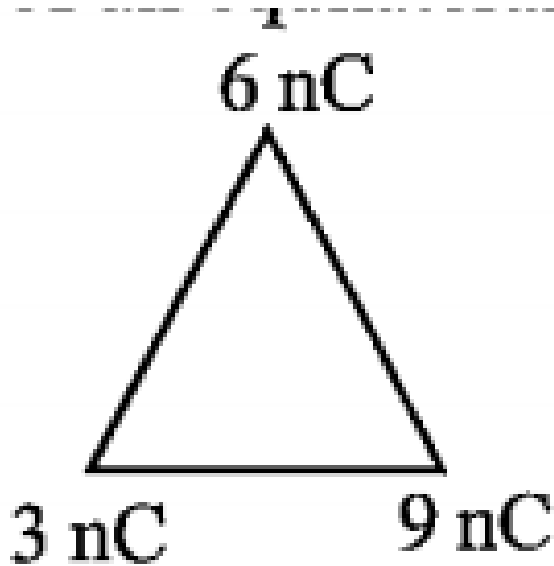B. $V_1 > V_2 > V_3$

C. $V_1 = V_2 < V_3$

D. $V_1 < V_2 < V_3$

Answer:

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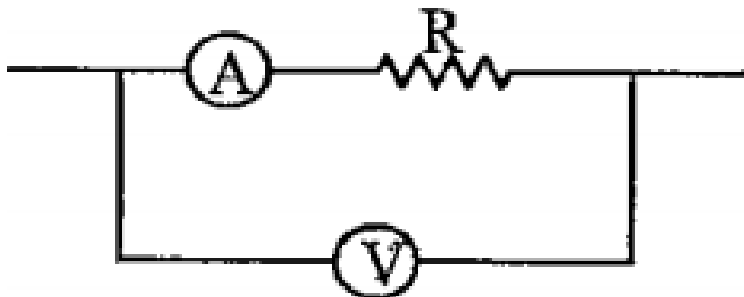
system is:

6 nC

3 nC   9 nC

A. 9910 nJ

B. 8910 nJ

C. 99100 mJ

D. 89100 kJ

Answer:

30. 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. $< 2 ohms$

B. $2 ohms$
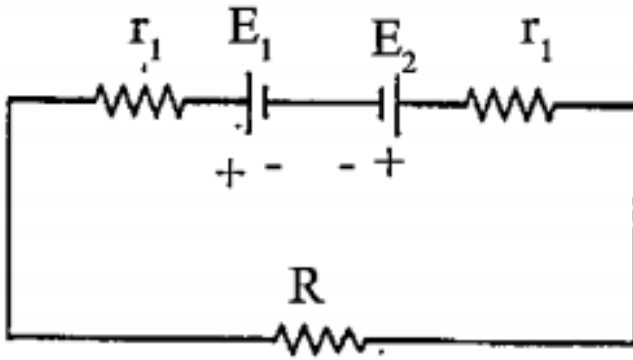
C. $\overset{>}{-} 2 ohms$

D. $> 2 ohms$

Answer:

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31. 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 resistances and R be the

external resistance, then the terminal potential difference is:

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

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

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

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

Answer:

32. If the velocity of light in a medium is $2.25 \times 10^8 ms^{-1}$ then the refractive index of the medium will be

A. 100m

B. 0.1 m

C. lm

D. 10m

Answer:

33. Two concentric coils each of radius equal to 2π cm are placed at right angles to each other. If 3A and 4A are the currents flowing through the two coils respectively. The magnetic induction (in Wbm^{-2} at the centre of the coils will be:

A. 5×10^{-5}

B. 12×10^{-5}

C. 7×10^{-5}

D. 10^{-5}

Answer:

34. The resistance of a bulb filament is 100Ω at a temperature of $100°C$. If its temperature coefficient of resistance be $0.005 per°C$, then its resistance will become 200Ω at a temperature:

A. $500°C$

B. $300^\circ C$

C. $200^\circ C$

D. $400^\circ C$

Answer:

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

A. 4Ω

B. 1Ω

C. 6Ω

D. 2Ω

Answer:

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36. Core of electro magnets are made of ferromagnetic material which has:

A. low permeability and high retentivity

B. high permeability and low retentivity

C. low permeability and low retentivity

D. high permeability and high retentivity

Answer:

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

A. $T = 2\pi\sqrt{\dfrac{1}{MB}}$

B. $T = \dfrac{1}{2}\pi\sqrt{\dfrac{MB}{1}}$

C. $T = 2\pi\sqrt{\dfrac{MB}{1}}$

D. $T = 2\pi\sqrt{\dfrac{MB}{1}}$

Answer:

38. Two parallel wires 1 m apart carry currents

of 1A and 3 A respectively in opposite

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

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

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

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

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

Answer:

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39. A galvanometer of resistance 50Ω gives a full scale deflection for a current $5 \times 10^{-4}A$ .The resistance that should be connected in series with the galvanometer to read 3 V is:

   A. 5059Ω

   B. 595Ω

   C. 5950Ω

   D. 5050Ω

Answer:

40. A cyclotron is used to accelerate:

A. only negatively charged particles

B. neutron

C. both positively and negatively charged

particles

D. only positively charged particles

Answer:

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41. A transformer is used to light a 100W and 110V lamp from 220V mains. If the main current is 0.5 amp, fhe efficiency of the transformer is approximately:

A. 0.96

B. 0.9

C. 0.99

D. 0.95

Answer:

42. In an LCR series circuit, at resonance

A. the current is minimum

B. the current and voltage are in phase

C. the current leads the voltage by $p/2$

D. the impedance is maximum

Answer:

43. An aircraft with a wingspan of 40 m flies with a speed of $1080km/h$ 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}T. Then the emf developed between the tips of the wings is:

A. 0.21V

B. 0.5 V

C. 2.1 V

D. 0.34 V

Answer:

44. Two coils have amutual inductance 0.005 H. The current changes in the first coil according to the equation $I = i_m \sin \omega t$, where $i_m = 10A$ and $w = 100\pi rads^{-1}$. The maximum value of the emf induced in the second coil is:

A. π

B. 2π

C. 4π

D. 5π

Answer:

45. The magnetic susceptibility of a paramagnetic material at $-73^\circ C$ is 0.0075 and its value at $-173^\circ C$ will be:

A. 0.015

B. 0.0045

C. 0.0075

D. 0.003

Answer:

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