



# PHYSICS

## BOOKS - SAI PHYSICS (TELUGU ENGLISH)

### MOCK TEST 2

Physics

# 1. Match the following

## List-I

- (a) Pressure
- (b) Latent heat
- (c) Velocity gradient
- (d) Magnetic flux

## List-II

- (e)  $ML^2T^{-2}I^{-1}$
- (f)  $L^0L^0T^{-1}$
- (g)  $ML^{-1}T^{-2}$
- (h)  $ML^2T^{-2}$

A. a-h b-f c-g d-e

B. a-g b-h c-e d-f

C. a-g b-h c-f d-e

D. a-f b-g c-e d-h

**Answer: B**



**Watch Video Solution**

2. A ball impinges directly upon another ball at rest and is itself brought to rest by the impact. If half of initial kinetic energy is destroyed in the collision. The coefficient of restitution is,

A. 0.3

B. 0.4

C. 0.5

D. 0.6

**Answer: C**



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3. A locomotive of mass 'm' starts moving so that its velocity varies as  $V = K\sqrt{S}$ , where 'K' is a constant and 'S', is the distance traversed. The total work done by all the forces acting on the locomotive during the first 't' seconds after the start of motion is,

A.  $\frac{1}{2}mK^4t^2$

B.  $\frac{1}{4}mK^4t^2$

C.  $\frac{1}{8}mK^4t^2$

D.  $\frac{1}{16}mK^4t^2$

**Answer: A**



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4. The amount of work done in lifting a body of mass 'm' from the surface of the earth to a height equal to twice the radius of the earth is,

A.  $3GM\frac{m}{2}R$

B.  $2GM\frac{m}{3}R$

C.  $5GM\frac{m}{3}R$

D.  $3GM\frac{m}{5}R$

**Answer: C**



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5. A circular coil of radius  $2R$  is carrying current ' $i$ '. The ratio of magnetic fields at the centre of the coil and at a point at a distance  $6$

R from the the centre of the coil on the axis of  
the coil is,

A.  $10\sqrt{10}$

B.  $10\sqrt{5}$

C.  $20\sqrt{5}$

D.  $20\sqrt{10}$

**Answer: B**



**Watch Video Solution**

6. Two simple pendulums of length 100 m and 121 m start swinging together in the same direction with same phase. They will swing together again in same phase after.

A. The longer pendulum completes 10 oscillation

B. The shorter pendulum makes 10 oscillation

C. The longer pendulum makes 11 oscillation



D. The shortest pendulum makes 20 oscillation

**Answer: B**



**Watch Video Solution**

7. An eraser weighing 2 N is pressed against the black board with a force of 5 N. If the coefficient of friction is 0.4. How much force parallel to the black board is required to slide the eraser upwards.

A. 2 N

B. 2.8 N

C. 4 N

D. 4.8 N

**Answer: D**



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8. Temperature of cold junction in a thermo couple is  $10^{\circ}C$  and neutral temperature is  $270^{\circ}C$  then the temperature of inversion is,

A.  $530^{\circ} C$

B.  $540^{\circ} C$

C.  $280^{\circ} C$

D.  $260^{\circ} C$

**Answer: A**



**Watch Video Solution**

9. When a capillary tube is dipped in water vertically, water rises to a height of 10 mm. The tube is now tilted and makes an angle  $60^{\circ} C$

with vertical. Now length of water column in tube is,

A. 10mm

B. 5mm

C. 20mm

D. 40mm

**Answer: D**



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10. An ideal fluid is flowing through four tubes a, b, c, d of radii in the ratio 2:7:3:1 with velocities in the ratio 1:2:5:15 when maintained at different pressures. The ascending order of the amount of fluid following through the tubes per second is,

A. a,b,c,d

B. b,c,d,a

C. c,d,b,a

D. d,a,b,c

**Answer: B**



**Watch Video Solution**

**11. Statement A:** In Ramsden's eyepiece the scale and the image are magnified proportionally, therefore measurements would be trust worthy.

**Statement B:** Ramsden's eyepiece minimises the spherical abberation because the total deviation is shared by the four refracting surfaces.

A. A is true and B is false

B. Both B are false

C. Both A and B are true

D. A is false and B is true

**Answer: A**



**View Text Solution**

**12.** Two equi-convex lenses, each of radius of curvature 20 cm and refractive index 1.5 are placed in contact. If water of refractive index

$\frac{4}{3}$  is placed in between the lenses, the focal length of the combination is,

- A. 15cm, convex
- B. 15cm, concave
- C. 7.5cm, convex
- D. 7.5cm, concave

**Answer: C**



**Watch Video Solution**



13. An inclined track ends in a circular loop of radius 'r'. From what height on the track a particle should be released so that it completes that loop in the vertical plane?

A.  $5\frac{r}{4}$

B.  $2\frac{r}{5}$

C.  $5\frac{r}{2}$

D.  $4\frac{r}{5}$

**Answer: A**



Watch Video Solution

**14.** If an air bubble rises from the bottom of a mercury tank to the top its volume becomes  $1\left(\frac{1}{2}\right)$  times. When normal pressure is 76 cm of Hg then the depth of the Hg tank is

A. 38 cm

B. 132 cm

C. 76 cm

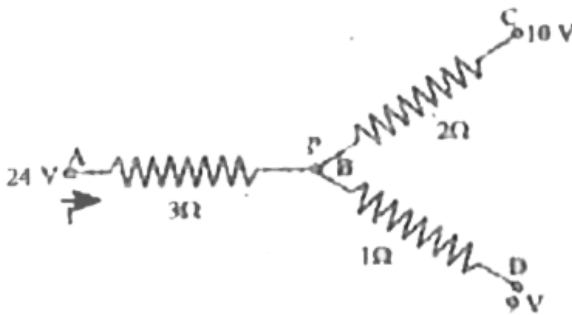
D. 49 cm

**Answer: B**



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**15.** In the circuit shown in the figure, the current 'I' is



A. 6A

B. 2A

C. 4A

D. 7A

**Answer: D**



**Watch Video Solution**

**16.** The wing span of an aeroplane is 20 m. It is flying in a field, where the vertical component of magnetic field of earth is  $5 \times 10^{-5}$  tesla, with velocity  $360 \text{ km/h}$ . The potential

difference produced between the blades will  
be

A. 0.10V

B. 0.15V

C. 0.20V

D. 0.30V

**Answer: C**



**Watch Video Solution**

17. 64 tuning forks are arranged such that each fork produces 4 beats per second with next one. If the frequency of the last fork is octave of the first, the frequency of 16<sup>th</sup> fork is

A. 316 Hz

B. 322 Hz

C. 312 Hz

D. 308 Hz

**Answer: A**



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18. A mass  $kg$  is suspended by a weightless string. The horizontal force required to hold the mass at  $60^\circ$  with the vertical is

A.  $Mg$

B.  $Mg\sqrt{3}$

C.  $Mg(\sqrt{3} + 1)$

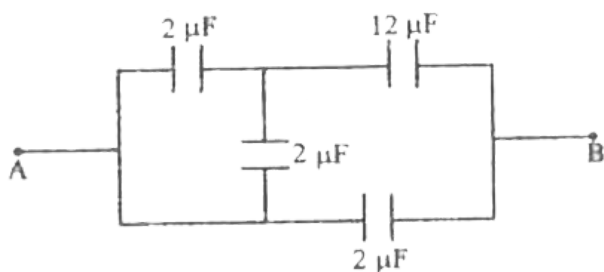
D.  $M\frac{g}{\sqrt{3}}$

**Answer: B**





19. The effective capacitance in  $\mu F$  in A and B will be



A.  $\frac{28}{9}$

B. 4

C. 18

D. 5



**Answer: A**



**Watch Video Solution**

20. Velocity of boat in still water is  $5\text{ m/s}$ . It crossed river of 60 m wide, with  $127^\circ$  angle always to the river flow. If the velocity of the river is  $3.5\text{ m/s}$  the drift obtained by boat in the river on reaching opposite bank is  $(\tan 37^\circ = 3/4)$

A. 22.5 m

B. 7.5 m

C. 16.5 m

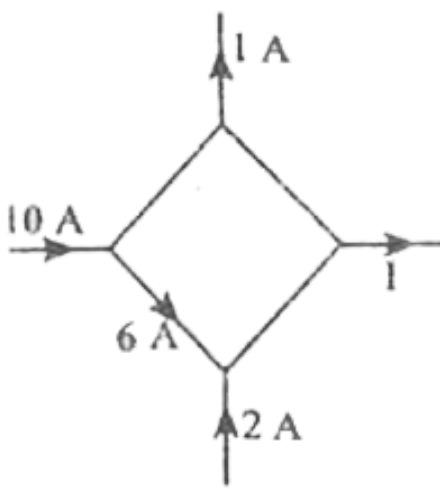
D. 9 m

**Answer: B**



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**21.** The value of current  $I$ , in the figure shown will be



A. 11A

B. 19A

C. 13A

D. 9A

**Answer: B**



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22. The balancing lengths of potentiometer wire are 800 cm and 600cm when two cells of emf's  $E_1$  and  $E_2$  are connected in the secondary circuit first in series and then terminals of one cell is reversed,  $\frac{E_1}{E_2}$  is equal to

A.  $\frac{1}{11}$

B.  $\frac{7}{1}$

C.  $\frac{14}{11}$

D.  $\frac{4}{3}$

**Answer: C**



**Watch Video Solution**

**23.** The minimum force required to move a body up an inclined plane is two times the minimum force required to prevent it from sliding down the plane. If coefficient of friction between the body and inclined plane is  $\frac{1}{\sqrt{3}}$  the angle of inclined plane is,

A.  $15^\circ$

B.  $45^\circ$

C.  $30^\circ$

D.  $60^\circ$

**Answer: B**



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**24.** An emf  $E = 4 \cos 1000t$  volt is applied to an L-R circuit of inductance 3 mH and resistance 4  $\Omega$ . The amplitude of the current in the circuit is

A. 1A

B. 0.8A

C.  $\frac{4}{\sqrt{7}}A$

D.  $\frac{5}{7}A$

**Answer: C**



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**25.** Two wires of same material have masses in the ratio 3:4 the ratio of their extensions

under the same load if their lengths are in the ratio 9:10 is

A. 5 : 3

B. 27 : 40

C. 6 : 5

D. 27 : 25

**Answer: C**



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**26.** A cannon ball is fired with a velocity of  $200\text{m/s}^{-1}$  at an angle of  $60^\circ$  with the horizontal. At the highest point of its flight it explodes into 3 equal fragments. One fragment is going vertically upwards with a velocity of  $100\text{m/s}$  and second going vertically downwards with a velocity of  $100\text{m/s}^{-1}$  the third fragment will be moving with a velocity of

A.  $600\text{m/s}^{-1}$  in the horizontal direction

B.  $300\text{m/s}^{-1}$  in the horizontal direction

C.  $300ms^{-1}$  in the direction making  $60^\circ$

with the horizontal

D.  $200ms^{-1}$  in the direction making  $60^\circ$

with the horizontal

**Answer: B**



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**27.** If the equation of motion of a projectile is

$y = 3x - \frac{1}{8}x^2$ , the range and maximum

height are respectively (y and x are in metres).

A. 18 m and 24 m

B. 24 m and 18 m

C. 24 m and 6 m

D. 12 m and 9 m

**Answer: A**



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**28.** If  $n_c$  and  $n_h$  are electron and hole concentrations in an extrinsic semiconductor

and  $n_i$  is electron concentrations in an intrinsic semiconductor, then

A.  $\left(\frac{n_e}{n_h}\right) = n_i$

B.  $(n_e + n_h) = n_i$

C.  $(n_e - n_h) = n_i^2$

D.  $(n_e n_h) = n_i^2$

**Answer: A**



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29. A radioactive nucleus can decay by two different processes. The half lives of the first and second decay processes are  $5 \times 10^3$  and  $10^5$  years respectively, Then, the effective half-life of the nucleus is,

A.  $105 \times 10^5$

B. 4762 yrs

C. 104 yrs

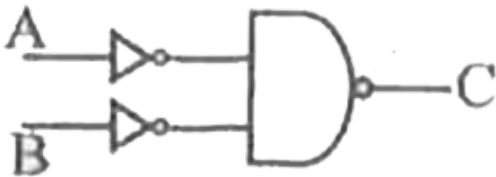
D. 47.6 yrs

**Answer: A**



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30. Which logic gate is represented by the following combination of logic gates



A. OR

B. NAND

C. AND

D. NOR

**Answer: A**



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**31. The FM radio broadcasting band is,**

A. 5 MHz to 30 MHz

B. 88 MHz to 108 MHz

C. 30 KHz to 300 KHz

D. 3 GHz to 30 GHz

**Answer: B**



**Watch Video Solution**

**32. Match the following**

**List-I**

- (a) Pressure
- (b) Latent heat
- (c) Velocity gradient
- (d) Magnetic flux

**List-II**

- (e)  $ML^2T^{-2}I^{-1}$
- (f)  $L^0L^0T^{-1}$
- (g)  $ML^{-1}T^{-2}$
- (h)  $ML^2T^{-2}$

A. a-h b-f c-g d-e

B. a-g b-h c-e d-f

C. a-g b-h c-f d-e



D. a-f b-g c-e d-h

**Answer: B**



**Watch Video Solution**

**33.** A ball impinges directly upon another ball at rest and is itself brought to rest by the impact. If half of initial kinetic energy is destroyed in the collision. The coefficient of restitution is,

A. 0.3

B. 0.4

C. 0.5

D. 0.6

**Answer: C**



**Watch Video Solution**

**34.** A locomotive of mass 'm' starts moving so that its velocity varies as  $V = K\sqrt{S}$ , where 'K' is a constant and 'S', is the distance traversed. The total work done by all the forces acting on

the locomotive during the first 't' seconds after the start of motion is,

A.  $\frac{1}{2}mK^4t^2$

B.  $\frac{1}{4}mK^4t^2$

C.  $\frac{1}{8}mK^4t^2$

D.  $\frac{1}{16}mK^4t^2$

**Answer: A**



**Watch Video Solution**

35. The amount of work done in lifting a body of mass 'm' from the surface of the earth to a height equal to twice the radius of the earth is,

A.  $3GM\frac{m}{2}R$

B.  $2GM\frac{m}{3}R$

C.  $5GM\frac{m}{3}R$

D.  $3GM\frac{m}{5}R$

**Answer: C**



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**36.** A circular coil of radius  $2R$  is carrying current ' $i$ '. The ratio of magnetic fields at the centre of the coil and at a point at a distance  $6R$  from the the centre of the coil on the axis of the coil is,

A.  $10\sqrt{10}$

B.  $10\sqrt{5}$

C.  $20\sqrt{5}$

D.  $20\sqrt{10}$

**Answer: B**



**Watch Video Solution**

**37.** Two simple pendulums of length 100 m and 121 m start swinging together in the same direction with same phase. They will swing together again in same phase after.

A. The longer pendulum completes 10 oscillation

B. The shorter pendulum makes 10 oscillation

C. The longer pendulum makes 11 oscillation

D. The shortest pendulum makes 20 oscillation

**Answer: B**



**Watch Video Solution**

**38.** An eraser weighing 2 N is pressed against the black board with a force of 5 N. If the coefficient of friction is 0.4. How much force parallel to the black board is required to slide the eraser upwards.

A. 2 N

B. 2.8 N

C. 4 N

D. 4.8 N

**Answer: D**





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39. Temperature of cold junction in a thermo couple is  $10^{\circ}C$  and neutral temperature is  $270^{\circ}C$  then the temperature of inversion is,

A.  $530^{\circ}C$

B.  $540^{\circ}C$

C.  $280^{\circ}C$

D.  $260^{\circ}C$

**Answer: A**



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40. When a capillary tube is dipped in water vertically, water rises to a height of 10 mm. The tube is now tilted and makes an angle  $60^\circ$  with vertical. Now length of water column in tube is,

A. 10mm

B. 5mm

C. 20mm

D. 40mm

**Answer: D**



**Watch Video Solution**

**41.** An ideal fluid is flowing through four tubes a, b, c, d of radii in the ratio 2:7:3:1 with velocities in the ratio 1:2:5:15 when maintained at different pressures. The ascending order of the amount of fluid following through the tubes per second is,

A. a,b,c,d

B. b,c,d,a

C. c,d,b,a

D. d,a,b,c

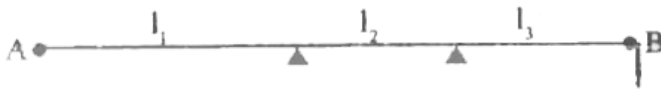
**Answer: B**



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**42.** A thin wire of length of 99 cm is fixed at both ends as shown in the figure. The wire is kept under a tension and is divided into three

segments of lengths 1, 1, and 1, as shown in figure. When the wire is made to vibrate, the segments vibrate respectively with their fundamental frequencies in the ratio 1:2:3. Then, lengths  $l_1, l_2, l_3$  of the segments respectively are (in cm)



- A. 27,54,18
- B. 18,27,54
- C. 54,27,18
- D. 527,9,14

**Answer: C**



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**43.** Statement A: In Ramsden's eyepiece the scale and the image are magnified proportionally, therefore measurements would be trust worthy.

Statement B: Ramsden's eyepiece minimises the spherical abberation because the total deviation is shared by the four refracting surfaces.

A. A is true and B is false

B. Both B are false

C. Both A and B are true

D. A is false and B is true

**Answer: A**



**View Text Solution**

**44.** Two equi-convex lenses, each of radius of curvature 20 cm and refractive index 1.5 are placed in contact. If water of refractive index

$\frac{4}{3}$  is placed in between the lenses, the focal length of the combination is,

- A. 15cm, convex
- B. 15cm, concave
- C. 7.5cm, convex
- D. 7.5cm, concave

**Answer: C**



**Watch Video Solution**



45. An inclined track ends in a circular loop of radius 'r'. From what height on the track a particle should be released so that it completes that loop in the vertical plane?

A.  $5\frac{r}{4}$

B.  $2\frac{r}{5}$

C.  $5\frac{r}{2}$

D.  $4\frac{r}{5}$

**Answer: A**



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**46.** When a big drop of water is formed from  $n$  small drops of water, the energy loss is  $3E$ , where,  $E$  is the energy of the bigger drop. If the radius of the bigger drop is  $R$  and  $r$  is the radius of the smaller drop, then number of smaller drops ( $n$ ) is

A.  $4\frac{R}{r^2}$

B.  $4\frac{R}{r}$

C.  $2\frac{R^2}{r}$

D.  $4\frac{R^2}{r^2}$

**Answer: C**



**Watch Video Solution**

**47.** If an air bubble rises from the bottom of a mercury tank to the top its volume becomes  $1\left(\frac{1}{2}\right)$  times. When normal pressure is 76 cm of Hg then the depth of the Hg tank is

A. 38 cm

B. 132 cm

C. 76 cm

D. 49 cm

**Answer: B**



**View Text Solution**

**48.** Two photons of energies twice and thrice the work function of a metal are incident on the metal surface .Then, the ratio of maximum

velocities of the photoelectrons emitted in the two cases respectively ,is

A.  $\sqrt{2}:1$

B.  $\sqrt{3}:3$

C.  $\sqrt{3}:\sqrt{2}$

D.  $1:\sqrt{2}$

**Answer: D**



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49. A gas is compressed at a constant pressure of  $50\text{ N/m}^2$ , from a volume  $10\text{ m}^3$  to a volume of  $4\text{ m}^3$ . 100 J of heat is added to the gas then its internal energy.

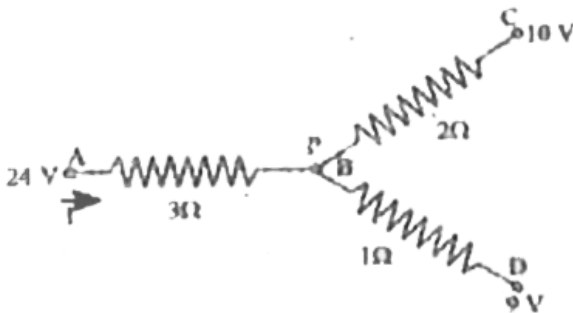
- A. Increases by 400 J
- B. Increases by 200 J
- C. Decreases by 400 J
- D. Decreases by 200 J

**Answer: A**



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50. In the circuit shown in the figure, the current 'I' is



- A. 6A
- B. 2A
- C. 4A
- D. 7A

**Answer: D**



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51. An ammeter whose resistance is  $180\Omega$  shows full scale deflection when the current is 2 mA. The shunt required to convert into an ammeter reading 20mA is (in ohm )

A. 18

B. 20

C. 0.1



D. 10

**Answer: D**



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**52.** The wing span of an aeroplane is 20 m. It is flying in a field, where the vertical component of magnetic field of earth is  $5 \times 10^{-5}$  tesla, with velocity  $360\text{km}/\text{h}$ . The potential difference produced between the blades will be

A. 0.10V

B. 0.15V

C. 0.20V

D. 0.30V

**Answer: C**



**Watch Video Solution**

**53.** 64 tuning forks are arranged such that each fork produces 4 beats per second with

next one. If the frequency of the last fork is octave of the first, the frequency of 16<sup>th</sup> fork is

A. 316 Hz

B. 322 Hz

C. 312 Hz

D. 308 Hz

**Answer: A**



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54. Two bodies of mass 4 kg and 5 kg are moving along East and North directions with velocities 5 m//s and 3 m//s respectively. Magnitude of the velocity of centre of mass of the system is

A.  $\frac{25}{9} m / s$

B.  $\frac{9}{25} m / s$

C.  $\frac{41}{9} m / s$

D.  $\frac{16}{9} m / s$

**Answer: A**



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55. The frequency of vibration in a vibration magnetometer of the combination of two bar magnets of magnetic moments  $M_1$  and  $M_2$  is 6 Hz when like poles are tied and it is 2 Hz when the unlike poles are tied together, then the ratio  $M_1 : M_2$  is

A. 4 : 5

B. 5 : 4

C. 1 : 3

D. 3: 1

**Answer: B**



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**56.** A short magnetic needle is pivoted in a uniform magnetic field of induction  $IT$ . Now, simultaneously another magnetic field of induction  $\sqrt{3} T$  is applied at right angles to the first field, the needle deflects through an angle  $\theta$  whose value is

A.  $30^\circ$

B.  $45^\circ$

C.  $90^\circ$

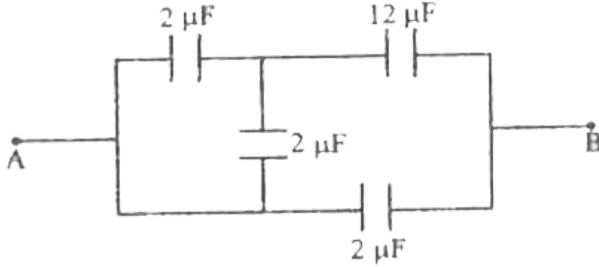
D.  $60^\circ$

**Answer: A**



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**57.** The effective capacitance in  $\mu F$  in A and B will be



A.  $\frac{28}{9}$

B. 4

C. 18

D. 5

**Answer: A**



**Watch Video Solution**



58. Velocity of boat in still water is  $5\text{ m/s}$ . It crossed river of  $60\text{ m}$  wide, with  $127^\circ$  angle always to the river flow. If the velocity of the river is  $3.5\text{ m/s}$  the drift obtained by boat in the river on reaching opposite bank is  $(\tan 37^\circ = 3/4)$

A.  $22.5\text{ m}$

B.  $7.5\text{ m}$

C.  $16.5\text{ m}$

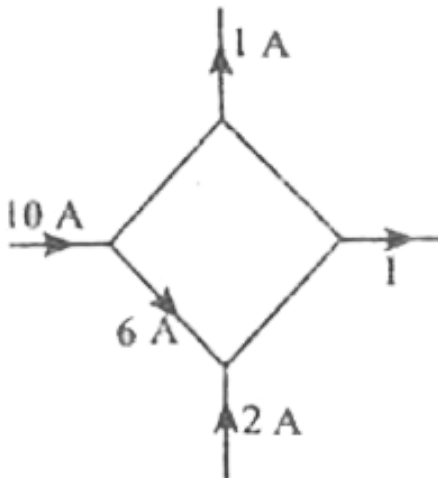
D.  $9\text{ m}$

**Answer: B**



**Watch Video Solution**

**59.** The value of current  $I$ , in the figure shown will be



**A.  $11\text{ A}$**

B. 19A

C. 13A

D. 9A

**Answer: B**



**Watch Video Solution**

**60.** The balancing lengths of potentiometer wire are 800 cm and 600cm when two cells of emf's  $E_1$  and  $E_2$  are connected in the

secondary circuit first in series and then terminals of one cell is reversed,  $\frac{E_1}{E_2}$  is equal to

A.  $\frac{1}{11}$

B.  $\frac{7}{1}$

C.  $\frac{14}{11}$

D.  $\frac{4}{3}$

**Answer: C**



**Watch Video Solution**

61. The minimum force required to move a body up an inclined plane is two times the minimum force required to prevent it from sliding down the plane. If coefficient of friction between the body and inclined plane is  $\frac{1}{\sqrt{3}}$  the angle of inclined plane is,

A.  $15^\circ$

B.  $45^\circ$

C.  $30^\circ$

D.  $60^\circ$

**Answer: B**



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**62.** An emf  $E = 4 \cos 1000t$  volt is applied to an L-R circuit of inductance 3 mH and resistance  $4 \Omega$ . The amplitude of the current in the circuit is

A. 1A

B. 0.8A

C.  $\frac{4}{\sqrt{7}}$  A

D.  $\frac{5}{7}A$

**Answer: C**



**Watch Video Solution**

**63.** Two wires of same material have masses in the ratio 3:4 the ratio of their extensions under the same load if their lengths are in the ratio 9:10 is

A. 5:3

B. 27: 40

C. 6: 5

D. 27: 25

**Answer: C**



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**64.** A cannon ball is fired with a velocity of  $200\text{ms}^{-1}$  at an angle of  $60^\circ$  with the horizontal. At the highest point of its flight it explodes into 3 equal fragments. One



fragment is going vertically upwards with a velocity of  $100\text{m/s}$  and second going vertically downwards with a velocity of  $100\text{m/s}^{-1}$  the third fragment will be moving with a velocity of

A.  $600\text{m/s}^{-1}$  in the horizontal direction

B.  $300\text{m/s}^{-1}$  in the horizontal direction

C.  $300\text{m/s}^{-1}$  in the direction making  $60^\circ$

with the horizontal

D.  $200\text{m/s}^{-1}$  in the direction making  $60^\circ$

with the horizontal

**Answer: B**



**Watch Video Solution**

## Chemistry

1. The ratio of energies of photons with wavelengths  $2000\text{Å}$  and  $4000\text{Å}$  is

A. 1 : 2

B. 4 : 1

C. 2 : 1

D. 1:4

**Answer: C**



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