PHYSICS

BOOKS - KCET PREVIOUS YEAR PAPERS

KARNATAKA CET 2008

Physics

1. If μ_0 is permeability of free space and ε_0 is permittivity of free space , the speed of light in vacuum is given by

A. $\sqrt{\frac{1}{\mu_0 \varepsilon_0}}$

B. $\sqrt{\frac{\varepsilon_0}{\mu_0}}$

C. $\sqrt{\mu_0 \varepsilon_0}$

D. $\sqrt{\frac{\mu_0}{\varepsilon_0}}$

Answer: A

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2. In Young's double slit experiment, a third slit is made in between the double sits. Then

A. firinges of unewual width are formed

B. contrast between bright and dark fringes is reduced

C. intensity of fringes totally disappeans

D. only bright is observed on the screen

Answer: B

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3. The maximum number of possible interference maxima when slit separation is equal to 4 times the wevelenght of light used in a double slit experiment is

A. 8

B. 4

C. ∞

D. 9

Answer:

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4. In a Fraunhofer diffraction experiment at single slit using a light of wavelength 400 nm , the first minimum is formed at an angle of 30° . The direction θ of the first secondary maximum is given by

A. $\sin^{-1}(1/4)$

B. $\tan^{-1}(2/3)$

C. $\sin^{-1}(2/3)$

D. $\sin^{-1}(3/4)$

Answer: D

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5. Maximum diffraction takes place in a given slit for

A. infrared light

B. radio waves

C. γ rays

D. ultravolet light

Answer:

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6. Solar spectrum is an example for

A. band absorption spectrum

B. line absorption spectrum

C. line emission spectrum

D. continuous emission spectrum

Answer: B

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7. When a piece of metal is illuminated by a monochromatics light of wavelength γ then stopping potential is $3V_s$. When same surface is illuminated by light of wavelength 2γ , then stopping potential becomes V_s . The value of threshold wavelength for photoelectric emission will be

A. $(4\gamma)/3$

B. 6γ

C. 4γ

D. 8γ

Answer: C

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8. The maximum kinetic energy of emitted electrons in a photoelectric effect does not depend upon

A. intensity

B. work function

C. wavelength

D. frequency

Answer: A

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9. The ration of minimum wavelengths of Lyman and Balmer series will be

A. 5

B. 10

C. 1.25

D. 0.25

Answer: D

10. Hydrogen atom does not emit X-rays because

A. its size is very small

B. energy levels in it are very close to each other

C. it contains only a single electron

D. energy levels in it are far apart

Answer: C

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11. A certain current on passing through a galvanometer produces a deflection of 100 divisions . When a shunt of one ohm is

connected , the deflection reduces to 1 division

. The galvanometer resistance is

A. 10Ω

B. 9.9Ω

C. 100Ω

D. 99Ω

Answer: D

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12. Two similar circular loops carry equal currents in the same direction . On moving the coils further apart , the electric current will

A. remain unaltered

B. increases in one and decreases in the second

C. increase in both

D. decrease in both

Answer: C

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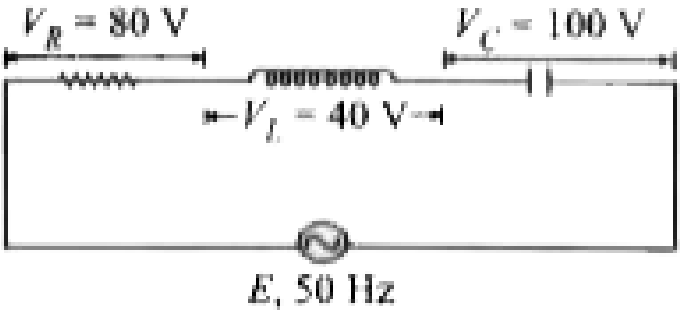
13. The value of alternating emf E in the given circuit will be



A. 100 V

B. 20 V

C. 220 V

D. 140 V

Answer: A

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14. A current of 5 A is flowing at 220 V in the primary coil of a transformer . If the voltage produced in the secondary coil is 2200 V and $50\,\%$ of power is lost, then the current in the secondary will be

A. $0.25A$

B. $0.5A$

C. $2.5A$

D. $5A$

Answer: A

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15. For a series LCR circuit at reasonance , the statement which is not true is

A. wattless current is zero

B. power factor is zero

C. peak energy stred by a capacitor = peak energy stored by an inductor

D. average power = apparemt power

Answer: B

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16. An unpolarised beam of intensity I_0 falls on a polaroid . The intensity of the emergent light is

A. $I_0/4$

B. zero

C. $I_0/2$

D. I_0

Answer: C

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17. Which of the following is a dichroic crysral?

A. Mica

B. Selenite

C. Quartz

D. Tourmaline

Answer: D

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18. Two identical metal spheres with +12 μC and $-8\mu C$ are kept at certain distance in air . They are brought into contact and then kept at the same distance . The ratio of the

magnitudes of electrostatic forces between them before and after contact is

A. $24:1$

B. $4:1$

C. $12:1$

D. $8:1$

Answer: A

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19. A small conducing sphere of radius r is lying concentrically inside a bigger hollow conducting sphere of radius R . The bigger and smaller spheres are charged with Q and q $(Q > q)$ and are insulated from each other . The potential difference between the spheres will be

A. $\frac{1}{4\pi\varepsilon_0}\left(\frac{q}{r} - \frac{Q}{R}\right)$

B. $\frac{1}{4\pi\varepsilon_0}\left(\frac{Q}{R} + \frac{q}{r}\right)$

C. $\frac{1}{4\pi\varepsilon_0}\left(\frac{q}{r} - \frac{q}{R}\right)$

D. $\frac{1}{4\pi\varepsilon_0}\left(\frac{q}{R}-\frac{Q}{r}\right)$

Answer: C

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20. The charges Q, +q and + q are placed at the vertices of an equilateral triangle of side l . If the net electrostatic potential energy of the system is zero , the Q is equal to

A. $+q/2$

B. zero

C. $-q/2$

D. $-q$

Answer: C

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21. If an electron and a proton have the same de - Broglie wavelength , then the kinetic energy of the electron is

A. more than that of a proton

B. equal to that of a proton

C. zero

D. less than that of a proton

Answer: A

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22. Two proton are kept at a separation of 40Å. F_n is the nuclear force and F_e is the electrostatic force between them . Then

A. $F_n < \ < F_e$

B. $F_n \approx F_e$

C. $F_n > \ > F_e$

D. $F_n = F_e$

Answer: A

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23. Blue colour of sea water is due to

A. image of sky in water

B. refreaction of sunlight

C. interference of sunlight reflected from the water surface

D. scattering of sunlight by the water molecules

Answer: D

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24. The ratio of the nuclear radii of elements with mass numbers 216 and 125 is

A. $6:5$

B. $\sqrt{216}:\sqrt{125}$

C. $126:125$

D. none of these

Answer: A

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25. On bombarding U^{235} by slow neutron , 200 Me V energy is released . If the power output of atomic reactor is 1.6 MW , then the rate of fission will be

A. $8 \times 10^{16} / s$

B. $20 \times 10^{16} / s$

C. $5 \times 10^{22} / s$

D. $5 \times 10^{16} / s$

Answer: D

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26. A ray of light enters from a rarer to a denser medium. The angle of incidence is I . Then the reflected and refracted rays are mutually perpendicular to each other . The critical angle for the pair of media is

A. $\sin^{-1}(\cot i)$

B. $\cos^{-1}(\tan i)$

C. $\sin^{-1}(\tan i)$

D. $\tan^{-1}(\sin i)$

Answer: A

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27. A fish in water (refractive index n) looks at a bird vertically above in the air. If y is the height of the bird and x is the depth of the fish from the surface, then the distance of the bird as estimated by the fish is

A. $x + y\left(1 + \frac{1}{n}\right)$

B. $y + x\left(1 - \frac{1}{n}\right)$

C. $x + y\left(1 - \frac{1}{n}\right)$

D. $x + ny$

Answer: D

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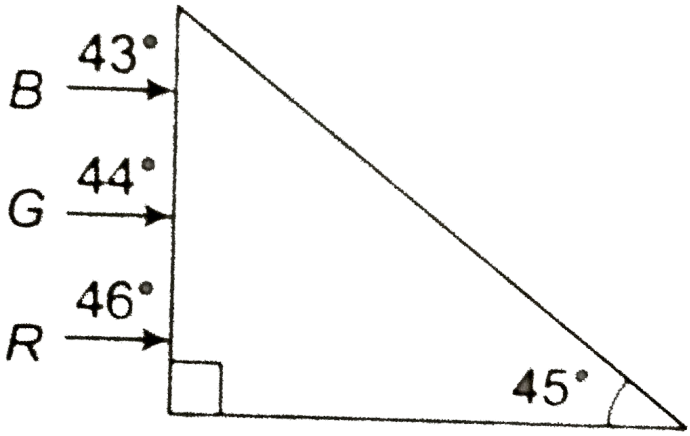
28. Figure shows a mixture of blue, green and red coloured rays incident normally on a right angled prism. The critical angles of the material of the prism for red, green and blue are 46°, 44° and 43° respectively. The

arrangement will separate



A. green colour from red and blue

B. all the three colours

C. red colour from blue and green

D. blue colour from red and green

Answer: C

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29. A convex and a concave lens separated by distance d are then put in contact . The focal length of the combination

A. becomes 0

B. remains the same

C. decreases

D. increases

Answer: A

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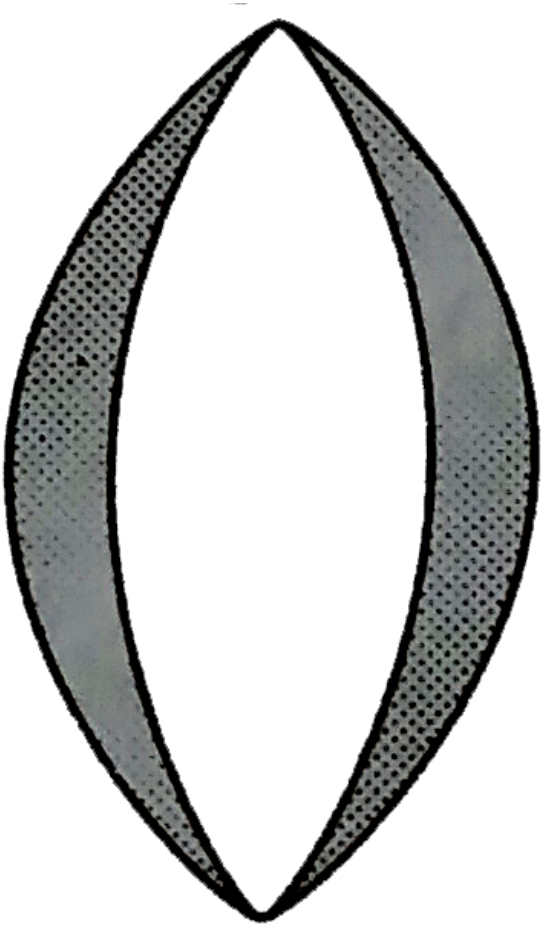

30.

A convex lens is made of 3 layers of glass of 3 different materials as in the figure. A point

object is placed on its axis. The number of images of the object are

A. 3

B. 4

C. 1

D. 2

Answer: C

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31. How many $6\mu F, 200V$ condensers are needed to make a condenser of $18\mu F, 600V$.

A. 3

B. 27

C. 9

D. 18

Answer: B

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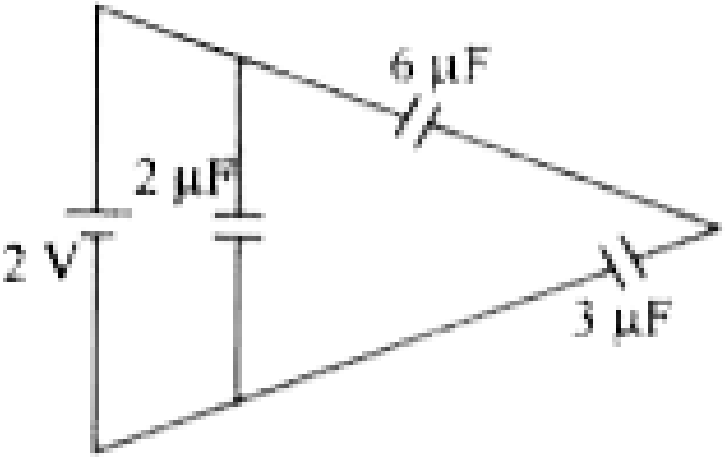
32. The total energy stored in the condenser system shown in the figure will be



A. $8\mu J$

B. $16\mu J$

C. $2\mu J$

D. $4\mu J$

Answer: A

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33. A metal wire is subjected to a constant potential difference . When the temperature of the metal wire increases , the drift velocity of the electron in it

A. increases , thermal velocity of the electron increases

B. decreases , thermal velocity of the electron increases

C. increases , thermal velocity of the electron decreases

D. decreases , thermal velocity of the electron decreases

Answer: B

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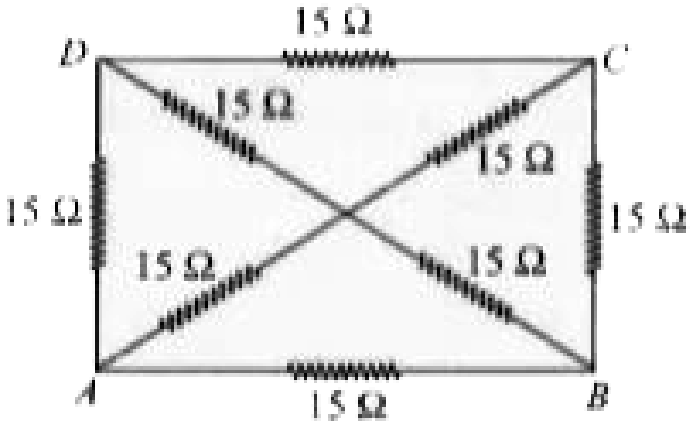
34. The equivalent resistance between the points A and B will be (each resistance is 15Ω)



A. 10Ω

B. 40Ω

C. 30Ω

D. 8Ω

Answer: D

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35. The terminals of a 18 V battery with an internal resistance of 24 Ω are connected to a circular wire of resistance 24Ω at two point distant at one quarter of the circumference of a circular wire . The current through the bigger arc of the circle will be

A. 0.225 A

B. 3A

C. 0.75 A

D. 1.5 A

Answer:

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36. The potential difference between A and B in the following figure is :

A. 24 V

B. 14 V

C. 32 V

D. 48 V

Answer: D

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37. The magnetic field at the centre of a circular current carrying conductor of radius r is B_c . The magnetic field on its axis at a

distance r from the centre is B_a. The value of $B_c : B_a$ will be

A. $2\sqrt{2} : 1$

B. $\sqrt{2} : 1$

C. $1 : \sqrt{2}$

D. $1 : 2\sqrt{2}$

Answer: A

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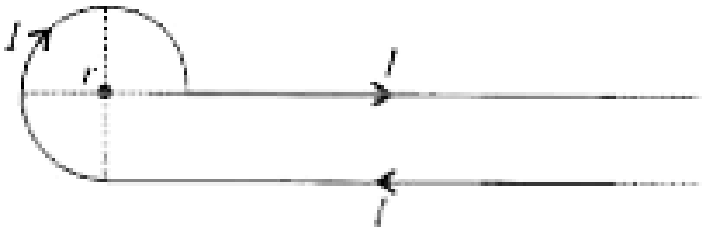
38. Current I is flowing in a conductor shaped as shown in the figure . The radius of the curved part is r and the length of straight portion is very large . The value of the magnetic field at the centre O will be



A. $\frac{\mu_0 I}{4\pi r}\left(\frac{\pi}{2}+1\right)$

B. $\frac{\mu_0 I}{4\pi r}\left(\frac{\pi}{2}-1\right)$

C. $\frac{\mu_0 I}{4\pi r}\left(\frac{3\pi}{2}+1\right)$

D. $\frac{\mu_0 I}{4\pi r}\left(\frac{3\pi}{2}-1\right)$

Answer: C

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39. Two tangent galvanometers A and B are identical except in their number of turns . They are connected in seris . On passing a current through them, deflections of 60° and 30° are produced . The ratio of the number of turns in A and B is

A. $1:2$

B. $2:1$

C. $1:3$

D. $3:1$

Answer: D

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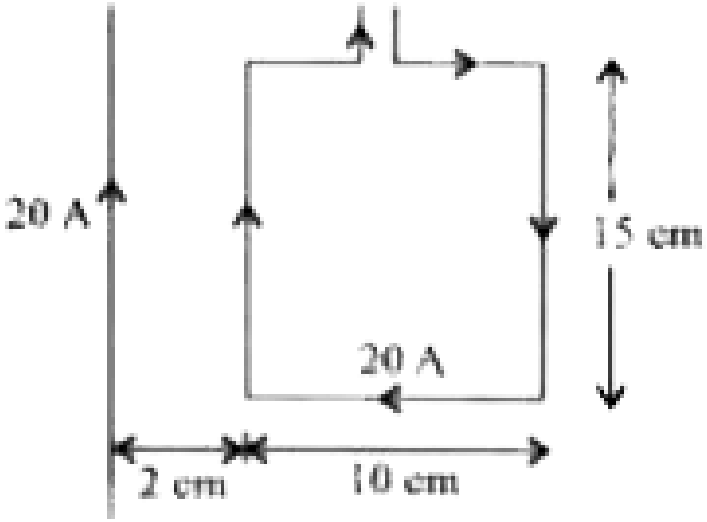
40. The ressultant force on the current looop PQRS due to a long current carrying conductor

will be



A. $1.8 \times 10^{-4} N$

B. $5 \times 10^{-4} N$

C. $10^{-4} N$

D. $3.6 \times 10^{-4} N$

Answer: B

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41. A simple pendulum is suspended from the ceiling of a lift . When the lift is at rest its time period is T. With what acceleration should the lift be accelerated upwards in order to reduce its period to $T/2$? (g is acceleration due to gravity).

A. 4g

B. g

C. 2g

D. 3g

Answer: D

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42. If γ is the ratio of specific heats and R is the universal gas constant , then the molar specific heat at constant volume C_v is given by

A. $\frac{R}{\gamma - 1}$

B. $\frac{\gamma R}{\gamma - 1}$

C. γR

D. $\frac{(\gamma - 1)R}{\gamma}$

Answer: A

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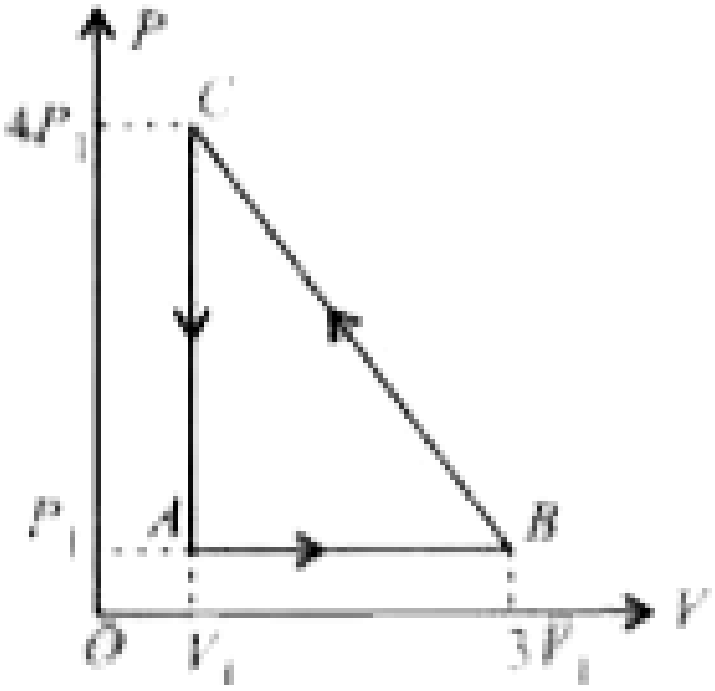
43. An ideal gas is taken via path ABCA as shown in figure . The network done in the

whole cycle is



A. $6P_1V_1$

B. zero

C. $3P_1V_1$

D. $-3P_1V_1$

Answer: D

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44. In which of the processes , does the internal energy of the system remain constant?

A. Isobaric

B. Isothermal

C. Adiabatic

D. Isochoric

Answer: B

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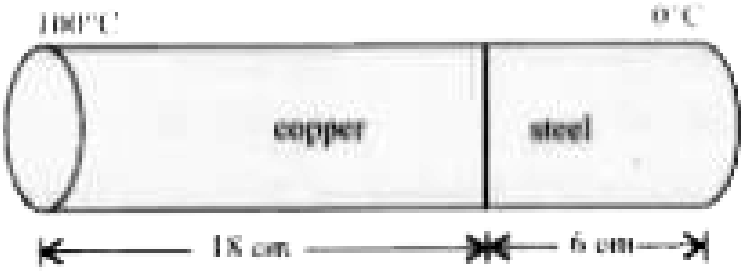
45. The coefficient of the thermal conductivity of copper is 9 times that of steel . In the composite sylindrical bar shown in the figure , what will be the temperature at the junction of copper and steel ?



A. $25^\circ C$

B. $33^\circ C$

C. $75^\circ C$

D. $67^\circ C$

Answer: C

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46. The number of nuclei of two radioactive substance is the same and their half-lives are 1

year and 2 years respectively. The ratio of their activities after 6 years will be

A. $1:3$

B. $1:6$

C. $1:4$

D. $1:2$

Answer: C

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47. ${}_{92}U^{235}$ undergoes successive disintegrations with the end product of ${}_{82}P^{203}$. The number of α and β particles emitted are

A. $\alpha = 8, \beta = 6$

B. $\alpha = 3, \beta = 3$

C. $\alpha = 6, \beta = 4$

D. $\alpha = 6, \beta = 0$

Answer: A

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48. The most stable free radical is :

A. proton

B. lambda - particle

C. neutron

D. omega - particle

Answer: A

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49. In an unbiased p-n jinction

A. Potential at p is equal to that at n

B. Potential at p is +ve and that at n is -ve

C. Potential at p is more that that at n

D. Potential at p is less than that at n

Answer: D

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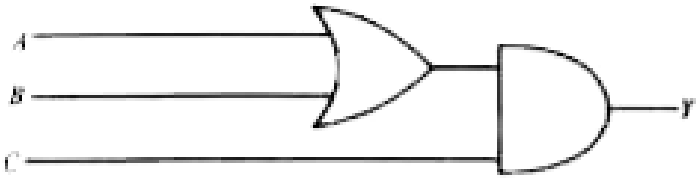
50. To get an output y=1 from the circuit shown , the input A,B and C must be respectively



A. 1,0,1

B. 1,1,0

C. 0,1,0

D. 1,0,0

Answer: A

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51. The equation of a simple harmonic wave is given by y=6 $\sin 2\pi(2t - 0.1x)$, where x and y are in mm and t is in seconds . The phase difference between two particles 2mm apart at any instant is

A. 54°

B. 72°

C. 18°

D. 36°

Answer: B

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52. With what velocity should an observer approach a stationary shound source so that the apparent frequency of shound should appear double the actual frequency ? (v is velocity of shound).

A. 2v

B. v

C. $v/2$

D. 3v

Answer: B

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53. If a black body emits 0.5 joules of energy per second when it is at 27°C , then the amount of energy emitted by it it when it is at $627^\circ C$ will be

A. $13.5J$

B. $135J$

C. $40.5J$

D. $162J$

Answer: C

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54. A string vibrates with a frequency of 200Hz . When its length is doubled and tension is altered , it begins to vibrate with a frequency

of 300 Hz . The ratio of the new tension to the original tension is

A. $3:1$

B. $1:3$

C. $9:1$

D. $1:9$

Answer: C

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55. How many times more intense is a 60 dB sound than a 30 dB sound ?

A. 100

B. 4

C. 1000

D. 2

Answer: C

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56. Dimensional formula for the universal gravitational constant G is

A. $M^{-1}L^3T^{-2}$

B. $M^{-1}L^3T^{-1}$

C. $M^{-1}L^2T^{-2}$

D. $M^0L^0T^0$

Answer: A

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57. A body is projected vertically upwards . The times corresponding to height h while ascending and while descending are t_1 and t_2 respectively . Then the velocity of projection is (g is acceleration due to gravity)

A. $\frac{g\sqrt{t}_1 t_2}{2}$

B. $\frac{g(t_1 + t_2)}{2}$

C. $g\sqrt{t_1 t_2}$

D. $\frac{gt_1 t_2}{t_1 + t_2}$

Answer: B

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58. A mass of 10 kg is suspended from a spring so that it makes angle of 60° with the veritical . The new reading of the balance is

A. $10\sqrt{3}$ kg wt

B. $20\sqrt{3}kgwt$

C. $20kgwt$

D. 10 kg wt

Answer: C

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59. A body weigh $50g$ in air and $40g$ in water. How much would it weigh in a liquid of specific gravity 1.5

A. 65 grams

B. 45 grams

C. 30 grams

D. 35 grams

Answer: D

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60. A body of mass 4 kg is accelerated up by a constant force, travels a distance of 5 m in the first second and a distance of 2m in the third second. The force acting on the body is

A. 6 N

B. 8 N

C. 2 N

D. 4 N

Answer: D

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