PHYSICS

BOOKS - KCET PREVIOUS YEAR PAPERS

KARNATAKA CET 2018

Physics

1. The energy equivalent to a substance of mass 1 g is

A. $18 \times 10^{13} J$

B. $9 \times 10^{13} J$

C. $18 \times 10^{6} J$

D. $9 \times 10^{6} J$

Answer: B

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2. The half - life of tritium is 12.5 years. What mass of tritium of initial mass 64 mg will remain undecayed after 50 years ?

A. 32 mg

B. 8 mg

C. 16 mg

D. 4 mg

Answer: D

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3. In a CE amplifier , the input ac signal to be amplified is applied across

A. forward biased emitter - base junction

B. reverse biased collector - base junction

C. reverse biased emitter - base junction

D. forward biased collector - base junction

Answer: A

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4. If A = 1 and B = 0 , then in terms of Boolean algebra , $A + \overline{B}$ is equal to

A. B

B. $\overline{B}$

C. A

D. $\overline{A}$

Answer: B::C

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5. The density of an electron - hole pair in a pure germanium is $3 \times 10^{-16} m^{-3}$ at room temperature. On doping with aluminium , the

hole density increase to $4.5 \times 10^{22} m^{-3}$ Now the electron density (in m) in doped germanium will be

A. 1×10^{10}

B. 2×10^{10}

C. 0.5×10^{10}

D. 4×10^{10}

Answer: B

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6. The dc common emitter current gain of a n - p - n transistor is 50 . The potential difference applied across the collector and emitter of a transistor used in CE configuration is V_{CE} = 2 V . If the collector resistance $R_C = 4K\Omega$, the base current and the collection current (I_B) and the collector current (I_C) are

A. $I_B = 10\mu A, I_C = 0.5mA$

B. $I_B = 0.5\mu A, I_C = 10mA$

C. $I_B = 5\mu A, I_C = 1mA$

D. $I_B = 1\mu A, I_C = 0.5mA$

Answer: A

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7. The radius of Earth is 6400 km. If the height of an antenna is 500 m , then its range is

A. 800 km

B. 100 km

C. 80 km

D. 10 km

Answer: C

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8. A space station is at a height equal to the radius of the Earth . If v_E is the escape velocity on the surface of the Earth , the same the spastation v_E

A. $\frac{1}{2}$

B. $\frac{1}{4}$

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

D. $\frac{1}{\sqrt{3}}$

Answer: C

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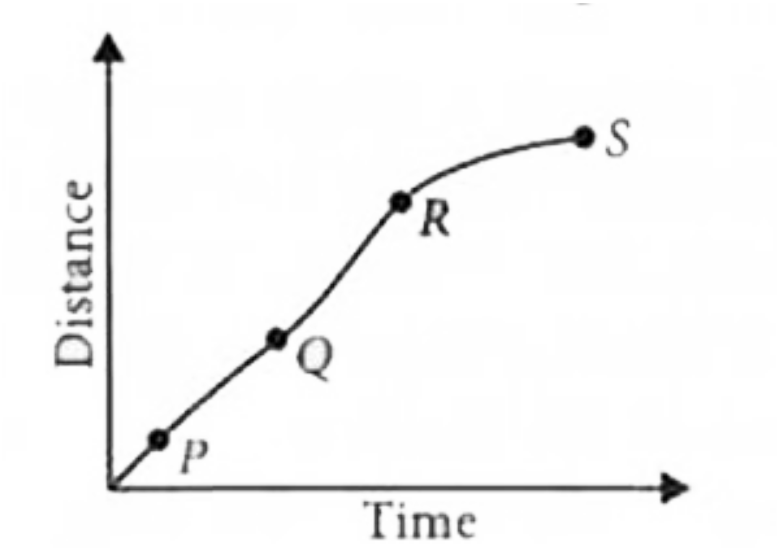
9. A particle shows distance - time curve as shown in the figure. The maximum instantaneous velocity of the particle is

around the point .



A. P

B. S

C. R

D. Q

Answer: C

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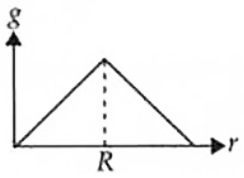
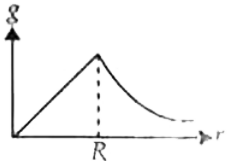
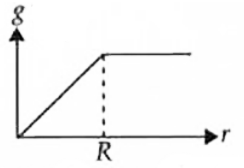
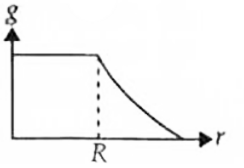
10. Which of the following graphs correctly represents the variation of g on the - Earth?

A. 

B. 

C. 

D. 

Answer: B

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11. A cup of tea cools from $65.5^\circ C$ to $62.5^\circ C$ in 1 minute in a room at $22.5^\circ C$ How long will it take to cool from $46.5^\circ C$ to $40.5^\circ C$ C in the same

A. 4 minutes

B. 2 minutes

C. 1 minute

D. 3 minutes

Answer: A

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12. The dimensions of the ratio of magnetic flux (ϕ) and permeability. (μ) are

A. $\left[M^0L^1T^0A^1\right]$

B. $\left[M^0L^{-3}T^0A^1\right]$

C. $\left[M^0L^1T^1A^{-1}\right]$

D. $\left[M^0L^0T^0A^1\right]$

Answer: A

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13. A mass m on the surface of the Earth is shifted to a target equal to the radius of the Earth. If R is the radius and M is the mass of the Earth, then work done in this process is

A. $\frac{mgR}{2}$

B. mgR

C. 2mgR

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

Answer: A

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14. First overtone frequency of a closed pipe of length l_1 is equal to the 2^{nd} harmonic frequency of an l_2 open pipe of length. The ratio $\frac{l_1}{l_2}$ =

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

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

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

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

Answer: A

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15. The resistance $R = \frac{V}{I}$ Where $V = (100p5)V$ and $I = (10 \pm 0.2)$. The percentage error in R is

A. 5.2%

B. 4.8%

C. 7%

D. 3%

Answer: C

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16. A block rests on a rough inclined plane making an angle of 30° with the horizontal . The coefficient of static friction between the

block and the plane is 0.8 If the frictional force on the block is 10 N the mass of the block is $(g = 10ms^{-2})$

A. 1 kg

B. 2 kg

C. 3 kg

D. 4 kg

Answer: B

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17. Two particle of masses m_1 and m_2 have equal kinetic energies . The ratio of their momenta is

A. $m_1 : m_2$

B. $m_2 : m_1$

C. $\sqrt{m}_1 : \sqrt{m}_2$

D. $m_1^2 : m_2^2$

Answer: C

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18. The pressure at the bottom of a liquid tank is not proportional to the

A. acceleration due to gravity

B. density of the liquid

C. height of the liquid

D. area of the liquid surface.

Answer: D

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19. A Carnot engine takes 300 calories of heat from a source at 500 K and rejects 150 calories of heat to the sink. The temperature of the sink is

A. 125 K

B. 250 K

C. 750 K

D. 1000 K

Answer: B

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20. The pressure of an ideal gas is Increased by keeping temperature constant . The kinetic energy of molecules

A. decreases

B. increases

C. remains same

D. increases of decreases deoinding on the nature of gas

Answer: C

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21. A man weighing 60 kg is a lift moving down with an acceleration of 1.8 m s^{-2} . The force exerted by the floor on him is

A. 588 N

B. 480 N

C. zero

D. 696 N

Answer: B

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22. Moment of inertia of a body about two perpendicular axes X and Y in the plane of lamina are $20\ \mathrm{kg\,m^2}$ and $25\mathrm{kg\,m^2}$ respectively. Its moment of inertia about an axis perpendicular to the plane of the lamina and passing through the point of intersection of X and Y axes is

A. $5\ \mathrm{kg\,m^2}$

B. $45\ \mathrm{kg\,m^2}$

C. $12.5 \quad \mathrm{kg\,m^2}$

D. $500 \quad \mathrm{kg\,m^2}$

Answer: B

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23. Two wires A and B are stretched by the same load . If the areas of cross - section of wire A is double that of B . then the stress in B is

A. equal to that on A

B. twice that on A

C. half that on A

D. four times that on A

Answer: B

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24. The magnitude of point charge due to which the electric field 30 c away has the magnitude $2\mathrm{N\ C^{-1}}$ will be

A. $2 \times 10^{-11} C$

B. $3 \times 10^{-11} C$

C. $5 \times 10^{-11} C$

D. $9 \times 10^{-11} C$

Answer: A

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25. A mass of 1 kg carrying a change of 2 C is accelerated through a potential of 1 V. The velocity acquired by it is

A. $\sqrt{2}\mathrm{m\ s}^{-1}$

B. $2\mathrm{m\ s}^{-1}$

C. $\frac{1}{\sqrt{2}}\mathrm{m\ s}^{-1}$

D. $\frac{1}{2}\mathrm{m\ s}^{-1}$

Answer: B

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26. The force of repulsion between two identical positive charge when kept with a separation r in air is F. Half the gap between

the two charges is filled by a dielectric slab of dielectric constant = 4 Then the new force of repulsion between those two charges become

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

B. $\frac{F}{2}$

C. $\frac{F}{4}$

D. $\frac{4F}{9}$

Answer: D

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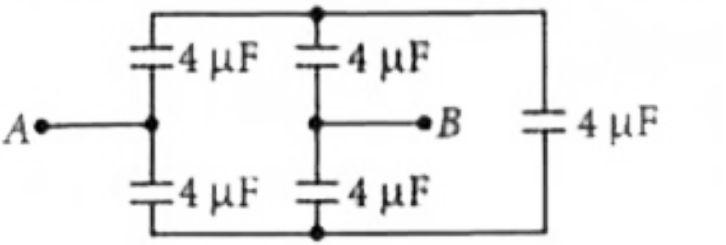
27. For the arrangement of capacitors as shown in the circuit , the effective capacitance between the points A and B is

(capacitance of each capacitor is $4\mu F$)



A. $4\mu F$

B. $2\mu F$

C. $1\mu F$

D. $8\mu F$

Answer: A

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28. The work done to move a charge on an equipotenital surface is

A. infinity

B. less than 1

C. greater than 1

D. zero

Answer: D

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29. Two capacitors of $3\mu F$ and $6\mu F$ are connected in series and a potential difference of 900 V is applied across the combination. They are then disconnected and reconnected in parallel. The potential difference across the combination is

A. zero

B. 100 V

C. 200 V

D. 400 V

Answer: D

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30. Ohm's law is applicable to

A. diode

B. transistor

C. electrolyte

D. conductor

Answer: D

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31. If the last band on the carbon resistor is absent, then the tolerance is

A. 5%

B. 20%

C. $10\ \%$

D. $15\ \%$

Answer: B

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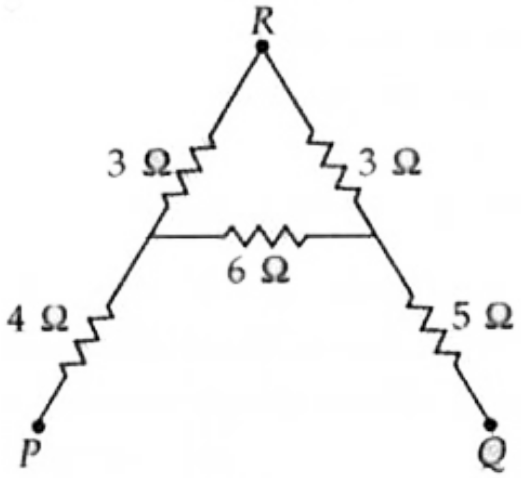
32. The effective resistance between P and Q for the following network is



A. $\frac{1}{12}\Omega$

B. 21Ω

C. 12Ω

D. $\frac{1}{21}\Omega$

Answer: C

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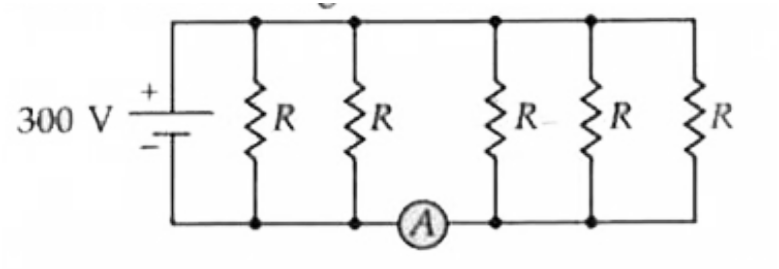
33. Five identical resistor each of resistance $R = 1500\Omega$ are connected to a 300 V battery as shown in the circuit. The reading of the ideal ammeter A is



A. $\frac{1}{5}A$

B. $\frac{3}{5}A$

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

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

Answer: B

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34. Two cells of internal resistance r_1 and r_2 and of same emf are connected in series across a resistor of resistance R. If the terminal potential difference across the call of internal resistance r_1 is zero , then the value of R is

A. $R = 2(r_1 + r_2)$

B. $R = r_2 - r_1$

C. $R = r_1 - r_2$

D. $R = 2(r_1 - r_2)$

Answer: C

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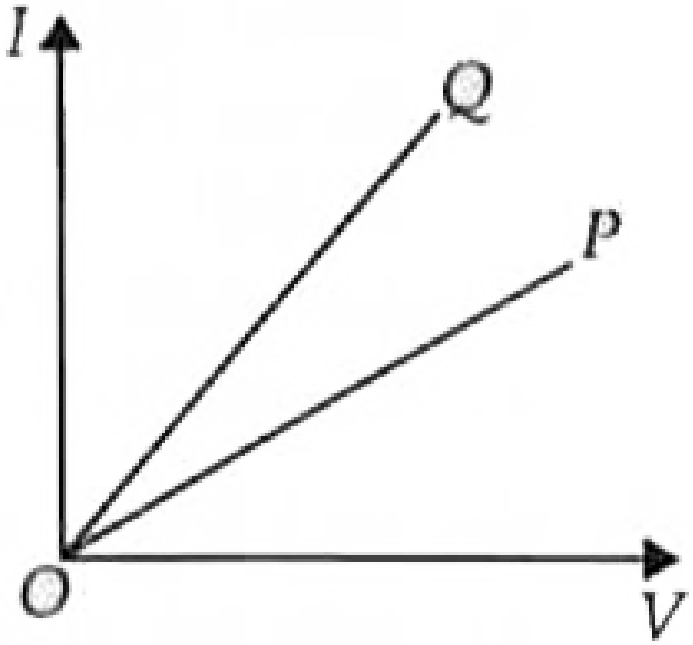
35. The I - V graphs for two different electrical appliance P and Q are shown in the diagram . If R_p and R_Q be the resistance of the devise ,

then



A. $R_P = R_Q$

B. $R_P > R_Q$

C. $R_P < R_Q$

D. $R_P = \frac{RQ}{2}$

Answer: B

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36. Give Biot - Savart formula in vector form.

A. $d\vec{B} = \frac{\mu_0}{4\pi} \frac{I\left(d\vec{l} \times \bar{r}\right)}{r^2}$

B. $d\vec{B} = \frac{\mu_0}{4\pi} \frac{I\left(d\vec{l} \times \bar{r}\right)}{r^3}$

C. $d\vec{B} = \frac{\mu_0}{4\pi} \frac{Id\vec{I}}{r^2}$

D. $d\vec{B} = \frac{\mu_0}{4\pi} \frac{Id\vec{I}}{r^3}$

Answer: B

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37. An electron is moving in a circle of radius r in a uniform magnetic field B. Suddenly the field is reduced to $\frac{B}{2}$. The radius of the circular path now becomes.

A. $\frac{r}{2}$

B. 2r

C. $\frac{r}{4}$

D. 4r

Answer: B

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38. A charge q is accelerated through a potential difference V . It is then passed normally through a uniform magnetic field, where it moves in a circle of radius r. Then potential difference required to move it in a circle of radius 2 r is

A. 2 V

B. 4 V

C. 1 V

D. 3 V

Answer: B

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39. A cycolotron's oscillator frequency is 10 MHz and the operating magnetic is 0.66 T . If the radius of its dees is 60 cm, then the kinetic

energy of the proton beam produced by the accelerator is

A. 9 MeV

B. 10 MeV

C. 7 MeV

D. 11 MeV

Answer: C

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40. Needle N_1, N_2 and N_3 are made of ferromagnetic , a paramagnetic and a diamagnetic substance respectively. A magnet when brought close to them will

A. attract all three of them

B. attract N_1 strongly , N_2 weakly and repel N_3 weakly

C. attract N_1 strongly but repel N_2 and N_3 weakly

D. attract N_1 and N_2 strongly but repel N_3

Answer: B

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41. The strength of the Earth's magnetic field is

A. constant everywhere

B. zero everywhere

C. having very high value

D. varying from place to place on the Earth's surface

Answer: D

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42. A jet plane having a wing - span of 25 m is travelling horizontally towards east with a speed of 3600 km /hour . If the the Earth's magnetic field at the location is 4×10^{-4} T

and the angle of dip is 30° , then the potential difference between the ends of the wing is

A. 4 V

B. 5 V

C. 2 V

D. 2.5 V

Answer: B

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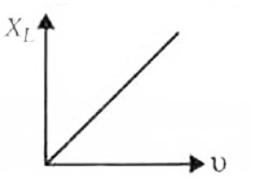
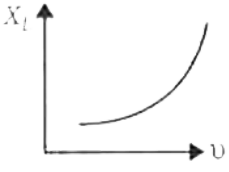
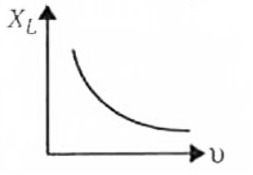
43. Which of the following represents the variation of inductive reactance (X_L) with the frequency of voltage source (υ) ?

A. 

B. 

C. 

D. 

Answer: A

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44. The magnetic flux linked with a coil varies as $\phi = 3t^2 + 4t + 9$. Find the magnitude of the emf induced at t = 2S.

A. 8 V

B. 16 V

C. 32 V

D. 64 V

Answer: B

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45. A 100 W bulb is connected to an AC source of 220 V, 50 HZ . Then the current flowing through the bulb is

A. $\frac{5}{11}A$

B. $\frac{1}{2}A$

C. $2A$

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

Answer: A

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46. In the series LCR circuit , the power dissipation is through

A. R

B. L

C. C

D. both L and C

Answer: A

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47. In Karnatake , the normal domestic power supply AC is 220 V, 50 Hz . Here 220 V and 50 Hz refer to

A. peak value of voltage and frequency

B. rms value of voltage and frequency

C. mean value of voltage and frequency

D. peak value of voltage and angular frequency

Answer: B

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48. A step - up transformer operates on a 230 V line and a load current of 2 A. The ratio of primary and secondary windings is 1 : 25 . Then te current in the primary is

A. 25 A

B. 50 A

C. 15 A

D. 12.5 A

Answer: B

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49. The number of photons falling per second on a completely darkened plate to produce force of $6.62 \times 10^{-5} N$ is n . If the wavelength

of the light falling is 5×10^{-7} m then n = ... $\times 10^{22}$.

($h = 6.62 \times 10^{-34} Js$)

A. 1

B. 5

C. 0.2

D. 3.3

Answer: B

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50. An objected is placed at the principle focus of a convex mirror. The image will be at

A. centre of curvature

B. principle focus

C. infinity

D. no image will be formed

Answer: C

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51. An object is placed at a distance of 20 cm from the pole of a concave mirror of focal length 10 cm. The distance of the image formed is

A. $+20$ cm

B. $+10$ cm

C. -20 cm

D. -10 cm

Answer: C

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52. A candle placed 25 cm from a lens forms an image on a screen placed 75 cm on the other side of the lens. The focal length and type of the lens should be

A. $+18.75$ cm and convex lens

B. -18.75 cm and convex lens

C. $+20.25$ cm and convex lens

D. -20.25 cm and convex lens

Answer: A

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53. A plane wavefront of wavelength λ is incident on a single slit of width a. The angular width of principal maximum is

A. $\frac{\lambda}{a}$

B. $\frac{2\lambda}{2}$

C. $\frac{a}{\lambda}$

D. $\frac{a}{2\lambda}$

Answer: B

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54. In Young's double - slit experiment if yellow light is replaced by blue light, the interference fringes become

A. remain unchanged

B. become wider

C. disappear

D. become narrower

Answer: D

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55. In Young's double slit experiment , two wavelengths $\lambda_1 = 780nm$ and $\lambda_2 = 520$ nm are used to obtain interference fringes. If the n^{th} bright band due to λ_1 coincides with $(n+1)^{th}$ bright band due to λ_2, then the value of n is

A. 4

B. 3

C. 2

D. 6

Answer: C

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56. A beam of light of two wavelengths 6500Å and 5200Å, is used to obtain interference fringes in Young's double slit experiment. Suppose the m^{th} brght fringe due to 6500Å

coincides with n^{th} bright fringe due to 5200Å at a minimum distance from the cental maximum. Then

A. 0.312 mm

B. 0.123 mm

C. 0.213 mm

D. 0.412 mm

Answer: A

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57. The maximum kinetic energy of emitted photoelectrons depends on

A. intensity of incident radiation

B. frequency of incident radiation

C. speed of incident radiation

D. number of photons in the incident rotation

Answer: B

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58. A proton and an α particle are accelerated through the same potential difference V. The ratio of their de Broglie wavelengths is

A. $\sqrt{2}$

B. $2\sqrt{2}$

C. $\sqrt{3}$

D. $2\sqrt{3}$

Answer: B

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59. The total energy of an electron revolving in the second orbit of hydrogen atom is

A. -13.6 eV

B. -1.51 eV

C. -3.4 eV

D. zero

Answer: C

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60. The period of revolution of an electron in the ground state of hydrogen atom is T. The period of revolution of the electron in the first excited state is

A. 2T

B. 4T

C. 6T

D. 8T

Answer: D

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