



# PHYSICS

## BOOKS - KCET PREVIOUS YEAR PAPERS

### KARNATAKA CET 2007

#### Physics

1. All components of the electromagnetic spectrum in vacuum have the same

A. energy

B. velocity

C. wavelength

D. frequency

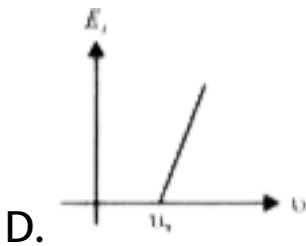
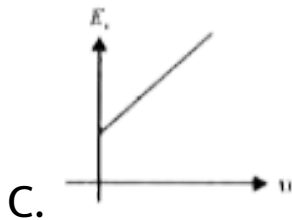
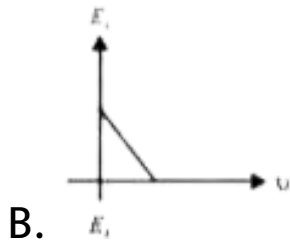
**Answer: B**



**Watch Video Solution**

2. Which one of the following graphs represents the variation of maximum kinetic

energy ( $E_K$ ) of the emitted electrons with frequency  $\nu$  in photoelectric effect correctly?



**Answer: D**



**Watch Video Solution**

3. A and B are two metals with threshold frequencies  $1.8 \times 10^{14}$  Hz and  $2.2 \times 10^{14}$  Hz. Two identical photons of energy 0.825 eV each are incident on them. Then photoelectrons are emitted in

(Take  $h = 6.6 \times 10^{-34}$  Js)

A. B alone

B. A alone

C. neither A nor B

D. both A and B

**Answer: B**



**Watch Video Solution**

4. the ionization energy of  $\text{Li}^{++}$  is equal to

A.  $9 hcR$

B.  $6 hcR$

C.  $2 hcR$

D.  $hcR$

**Answer: A**



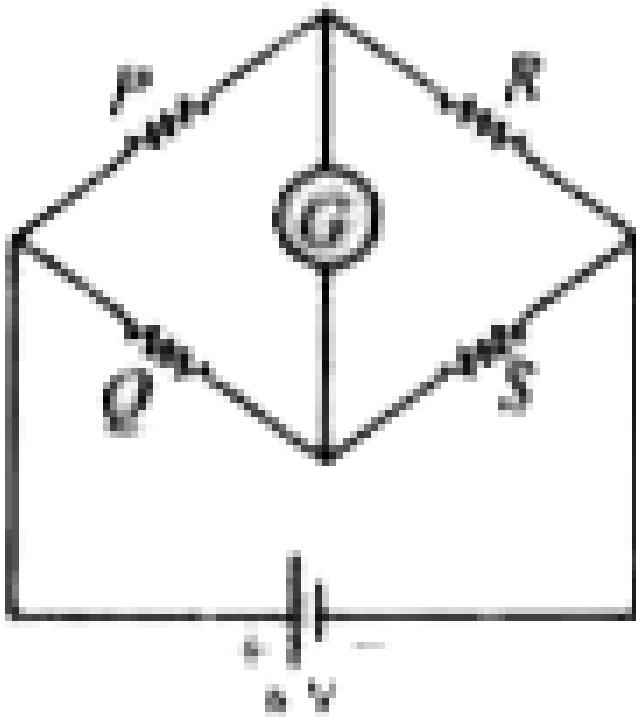
**Watch Video Solution**

5. In the Wheatstone's network given,

$P = 10\Omega$ ,  $Q = 20\Omega$ ,  $R = 15\Omega$ ,  $S = 30\Omega$ . The

current passing through the battery (of

negligible internal resistance) is



A. 0.36 A

B. 0 A

C. 0.18 A

D. 0.72 A

**Answer: A**



**Watch Video Solution**

6. Electrons in a certain energy level  $n = n_1$ , can emit 3 spectral lines. When they are in another energy level,  $n = n_2$ . They can emit 6 spectral lines. The orbital speed of the electrons in the two orbits are in the ratio.

A. 4 : 3

B. 3 : 4



C. 2:1

D. 1:2

**Answer: A**



**Watch Video Solution**

7. A circular coil carrying a certain current produces a magnetic field  $B_0$  at its centre. The coil is now rewound so as to have 3 turns and the same current is passed through it. The new magnetic field at the centre is

A.  $\frac{B_0}{9}$

B.  $9B_0$

C.  $\frac{B_0}{3}$

D.  $3B_0$

**Answer: B**



**Watch Video Solution**

8. A proton and a deuteron with the same initial kinetic energy enter a magnetic field in a direction perpendicular to the direction of the

field. The ratio of the radii of the circular trajectories described by them is

A. 1 : 4

B. 1 :  $\sqrt{2}$

C. 1 : 1

D. 1 : 2

**Answer: B**



**Watch Video Solution**

9. Two tangent galvanometers A and B have coils of radii  $8\text{cm}$  and  $16\text{cm}$  respectively and resistance  $80\text{ohm}$  each. They are connected in parallel to a cell of emf  $4\text{V}$  and negligible internal resistance. The deflections produced are  $30^\circ$  and  $60^\circ$  respectively. A has 2 turns. What is the number of turns in B?

A. 18 turns

B. 12 turns

C. 6 turns

D. 2 turns

**Answer: B**



**Watch Video Solution**

**10.** A charged particle is moving in a magnetic field of strength  $B$  perpendicular to the direction of the field. If  $q$  and  $m$  denote the charge and mass of the particle respectively, then the frequency of rotation of the particle is

$$\text{A. } f = \frac{qB}{2\pi m}$$

$$\text{B. } f = \frac{qB}{2\pi m^2}$$

$$\text{C. } f = \frac{2\pi^2 m}{qB}$$

$$\text{D. } f = \frac{2\pi m}{qB}$$

**Answer: A**



**Watch Video Solution**

11. Two identical capacitors each of capacitance  $5\mu F$  are charged to potentials 2 kV and 1 kV respectively. The -ve ends are

connected together. When the +ve ends are also connected together, the loss of energy of the system is

A. 160 J

B. 0 J

C. 5 J

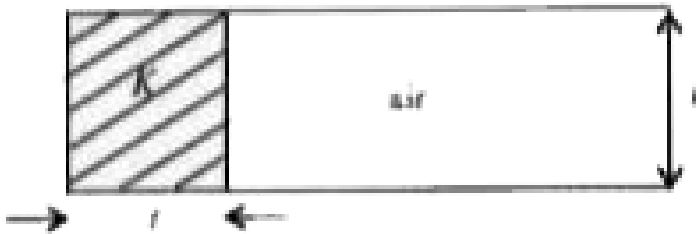
D. 1.25 J

**Answer: D**



**Watch Video Solution**

12. A parallel plate capacitor with air as the dielectric has capacitance  $C$ . A slab of dielectric constant  $K$  and having the same thickness as the separation between the plates is introduced so as to fill one-fourth of the capacitor as shown in the figure. The new capacitance will be



A.  $(K + 3) \frac{C}{4}$

B.  $(K + 2) \frac{C}{4}$



C.  $(K + 1) \frac{C}{4}$

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

**Answer: A**



**Watch Video Solution**

**13.** A current of 5 A is passing through a metallic wire of cross-sectional area  $4 \times 10^{-6} m^2$ . If the density of charge carriers of the wire is  $5 \times 10^{26} m^{-3}$ , the drift velocity of the electrons will be

A.  $1 \times 10^2 ms^{-1}$

B.  $1.56 \times 10^{-2} ms^{-1}$

C.  $1.56 \times 10^{-3} ms^{-1}$

D.  $1 \times 10^{-2} ms^{-1}$

**Answer: B**



**Watch Video Solution**

**14.** Two bulbs rated 25 W - 220V and 100 W-  
220 V are connected in series to a 440 V  
supply. Then,

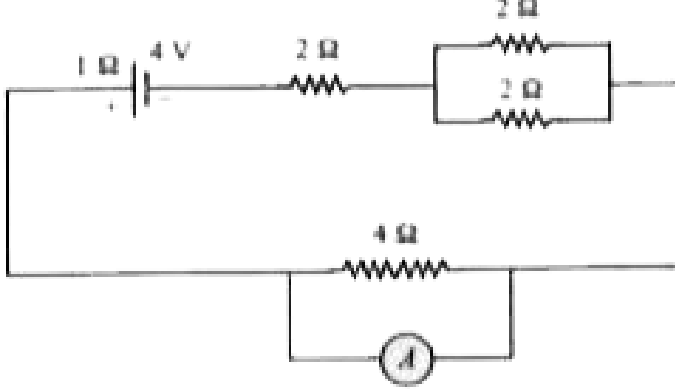
- A. 100 W bulb fuses
- B. 25 W bulb fuses
- C. both the bulb fuses
- D. neither of the bulb fuses.

**Answer: B**



**Watch Video Solution**

**15.** The current passing through the ideal ammeter in the circuit given below is



A. 1.25 A

B. 1 A

C. 0.75 A

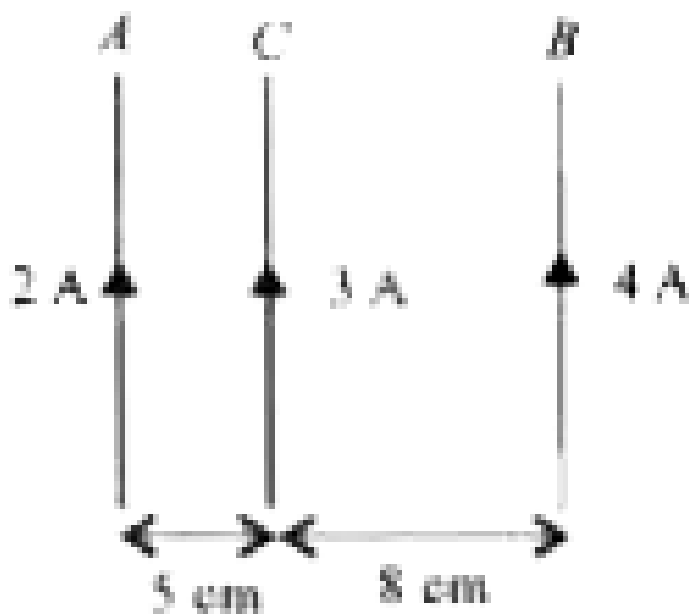
D. 0.5 A.

**Answer: D**



**Watch Video Solution**

16. A and B are two infinitely long straight parallel conductors. C is another straight conductor of length 1 m kept parallel to A and B as shown in the figure. Then the force experienced by C is



A. towards A equal to  $0.6 \times 10^{-5} N$

B. towards B equal to  $5.4 \times 10^{-5} N$

C. towards A equal to  $5.4 \times 10^{-5} N$

D. towards B equal to  $0.6 \times 10^{-5} N$

**Answer: D**



**Watch Video Solution**

**17.** An electric bulb has a rated power of 50 W at 100 V. If it is used on an a.c. Source 200 V, 50

Hz, a choke has to be used in series with it. This choke should have an inductance of

A. 0.1 mH

B. 1 mH

C. 0.1 H

D. 1.1 H

**Answer: D**



**Watch Video Solution**

18. An inductance of  $\left(\frac{200}{\pi}\right)$  mH, a capacitance of  $\left(\frac{10^{-3}}{\pi}\right)$  F and a resistance of  $10\Omega$  are connected in series with an a.c source 220 V, 50 Hz. The phase angle of the circuit is

A.  $\frac{\pi}{6}$

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

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

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

**Answer: B**







19. A stepdown transformer reduces the voltage of a transmission line from 2200V to 220V. The power delivered by it is 880 W and its efficiency is 88%. The input current is

A. 4.65 mA

B. 0.0465 A

C. 0.465 A

D. 4.65 A

**Answer:**



**Watch Video Solution**

**20.** Current in a coil changes from 4 A to zero in 0.1 second and the emf induced is 100 V. The self inductance of the coil is

A. 0.25 H

B. 0.4 H

C. 2.5 H

D. 4 H

**Answer: C**



**Watch Video Solution**

**21.** Newton's corpuscular theory of light failed to explain

A. photoelectric effect

B. polarisation

C. diffraction

D. interference

**Answer: A**



**Watch Video Solution**

22. Light from two coherent sources of the same amplitude  $A$  and wavelength  $\lambda$  illuminates the screen. The intensity of the central maximum is  $I_0$ . If the sources were incoherent, the intensity at the same point will be

A.  $4I_0$

B.  $2I_0$

C.  $I_0$

D.  $\frac{I_0}{2}$

**Answer: D**



**Watch Video Solution**

**23.** In Young's double slit experiment with sodium vapour lamp of wavelength 589 nm and the slits 0.589 mm apart, the half angular width of the central maximum is

A.  $\sin^{-1} 0.01$

B.  $\sin^{-1} 0.0001$

C.  $\sin^{-1} 0.001$

D.  $\sin^{-1} 0.1$

**Answer: C**



**Watch Video Solution**

**24.** A single slit Fraunhofer diffraction pattern is formed with white light. For what wavelength of light the third secondary

maximum in the diffraction pattern coincides with the second secondary maximum in the pattern of red light of wavelength  $6500 \text{ \AA}$ ?

A.  $4400 \text{ \AA}$

B.  $4100 \text{ \AA}$

C.  $4642.8 \text{ \AA}$

D.  $9100 \text{ \AA}$

**Answer: C**



**Watch Video Solution**

25. The head lights of a jeep are 1.2 m apart. If the pupil of the eye of an observer has a diameter of 2 mm and light of wavelength  $5896 \text{ \AA}$  is used, what should be the maximum distance of the jeep from the observer if the two head lights are just separated?

A. 33.9 km

B. 33.9 m

C. 3.39 km

D. 3.39 m



**Answer: C**



**Watch Video Solution**

**26.** The de Broglie wavelength of a proton (charge =  $1.6 \times 10^{-19}$  C, mass =  $1.6 \times 10^{-27}$  kg) accelerated through a potential difference of 1 kV is

A.  $600 \text{ \AA}$

B.  $0.9 \times 10^{-12} \text{ m}$

C.  $7 \text{ \AA}$

D.  $0.9\text{\AA}$

**Answer: B**



**Watch Video Solution**

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

A. 3  $\beta$ - particles

B. 2  $\beta$ - particles and 1  $\alpha$ - particle

C. 2  $\beta$  - particles and 1  $\gamma$ - particle

D. 2  $\alpha$ -particles and 1  $\beta$ - particle.

**Answer: B**



**Watch Video Solution**

**28.** A radioactive substance contains 10, 000 nuclei and its half - life period is 20 days.The number of nuclei present at the end of 10 days is

A. 7070

B. 9000

C. 8000

D. 7500

**Answer: A**



**Watch Video Solution**

**29.** In Raman effect, Stokes' lines are spectral lines having

A. frequency greater than that of the original line

B. wavelength equal to that of the original line

C. wavelength less than that of the original line

D. wavelength greater than that of the original line

**Answer: D**



**Watch Video Solution**

**30.** The principal of LASER action involves

- A. amplification of particular frequency emitted by the system
- B. population inversion
- C. stimulated emission
- D. all of these

**Answer: D**



**Watch Video Solution**

31. A ray of light is travelling from glass to air (Refractive index of glass = 1.5). The angle of incidence is  $50^\circ$ . The deviation of the ray is

A.  $0^\circ$

B.  $80^\circ$

C.  $50^\circ - \sin^{-1} \left[ \frac{\sin 50^\circ}{1.5} \right]$

D.  $\sin^{-1} \left[ \frac{\sin 50^\circ}{1.5} \right] - 50^\circ$

**Answer: B**



**Watch Video Solution**

32. A vessel of height  $2d$  is half-filled with a liquid of refractive index  $\sqrt{2}$  and the other half with a liquid of refractive index  $n$ . (The given liquids are immiscible). Then the apparent depth of the inner surface of the bottom of the vessel (neglecting the thickness of the bottom of the vessel) will be

A. 
$$\frac{n}{d(n + \sqrt{2})}$$

B. 
$$\frac{d(n + \sqrt{2})}{n\sqrt{2}}$$



C.  $\frac{\sqrt{2}n}{d(n + \sqrt{2})}$

D.  $\frac{nd}{d + \sqrt{2}n}$

**Answer: B**



**Watch Video Solution**

**33.** A ray of light is incident normally on one face of a right-angled isosceles prism and then it grazes the hypotenuse. The refractive index of the material of the prism is

A. 1.33

B. 1.414

C. 1.5

D. 1.732

**Answer: B**



**Watch Video Solution**

**34.** Two thin equiconvex lenses each of focal length 0.2 m are placed coaxially with their

optic centres 0.5 m apart. Then the focal length of the combination is

A.  $-0.4$  m

B.  $0.4$  m

C.  $-0.1$  m

D.  $0.1$  m

**Answer: A**



**Watch Video Solution**

**35.** A prism of a certain angle deviates the red and blue rays by  $8^\circ$  and  $12^\circ$  respectively. Another prism of the same angle deviates the red and blue rays by  $10^\circ$  and  $14^\circ$  respectively. The prisms are small angled and made of different materials. The dispersive powers of the materials of the prisms are in the ratio

A. 5:6

B. 9:11

C. 6:5

D. 11:9

**Answer: C**



**Watch Video Solution**

**36.** When the angle of incidence is  $60^\circ$  on the surface of a glass slab, it is found that the reflected ray is completely polarised. The velocity of light in glass is

A.  $\sqrt{2} \times 10^8 \text{ms}^{-1}$

B.  $\sqrt{3} \times 10^8 \text{ms}^{-1}$

C.  $2 \times 10^8 \text{ms}^{-1}$

D.  $3 \times 10^8 \text{ms}^{-1}$

**Answer: B**



**Watch Video Solution**

**37.** A  $20\text{cm}$  length of a certain solution causes right-handed rotation of  $38^\circ$ . A  $30\text{cm}$  length of another solution causes left-handed rotation of  $24^\circ$ . The optical rotation caused by

30cm length of a mixture of the above solutions in the volume ratio 1 : 2 is

A. left handed rotation of  $14^\circ$

B. right handed rotation of  $14^\circ$

C. left handed rotation of  $3^\circ$

D. right handed rotation of  $3^\circ$

**Answer: D**



**Watch Video Solution**

38. Two identical charges repel each other with a force equal to 10 mgwt when they are 0.6 m apart in air ( $g = 10ms^{-2}$ ). The value of each charge is

A.  $2mC$

B.  $2 \times 10^{-7}mC$

C.  $2nC$

D.  $2\mu C$

**Answer: D**



Watch Video Solution



**39.** The potential of the electric field produced by point charge at any point  $(x, y, z)$  is given by  $V = 3x^2 + 5$ , where  $x, y$  are in metres and  $V$  is in volts. The intensity of the electric field at  $(-2, 1, 0)$  is :

A.  $+17Vm^{-1}$

B.  $-17Vm^{-1}$

C.  $+12Vm^{-1}$

D.  $-12Vm^{-1}$

**Answer: D**



**Watch Video Solution**

**40.** The potential of a large liquid drop when eight liquid drops are combined is 20 V. Then, the potential of each single drop was

A. 10 V

B. 7.5V

C. 5 V

D. 2.5V

**Answer: C**



**Watch Video Solution**

**41.** The dimensional formula for impulse is \_\_\_\_\_

A.  $MLT^{-1}$

B.  $ML^{-1}T$

C.  $M^{-1}LT^{-1}$

D.  $ML^{-1}T^{-1}$

**Answer: A**



Watch Video Solution

42. The maximum height attained by a projectile when thrown at an angle  $\theta$  with the horizontal is found to be half the horizontal range. Then  $\theta =$

A.  $\tan^{-1}(2)$

B.  $\frac{\pi}{6}$

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

D.  $\tan^{-1}\left(\frac{1}{2}\right)$

**Answer: A**



**Watch Video Solution**

**43.** A shell of mass 20 kg at rest explodes into two fragments whose masses are in the ratio 2:3. The smaller fragment moves with a velocity of  $6\text{ms}^{-1}$ . The kinetic energy of the larger fragment is

A. 96 J

B. 216 J

C. 144 J

D. 360 J

**Answer: A**



**Watch Video Solution**

**44.** Water rises in plant fibres due to

A. capillarity

B. viscosity

C. fluid pressure

D. osmosis

**Answer: A**



**Watch Video Solution**

**45.** The acceleration due to gravity becomes  $\left(\frac{g}{2}\right)$  where  $g$  = acceleration due to gravity on the surface of the earth at a height equal to

A.  $4R$

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

C.  $2R$

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

**Answer: B**



**Watch Video Solution**

**46.** The cylindrical tube of a spray pump has a cross-section of  $8\text{cm}^2$ , one end of which has 40 fine holes each of area  $10^{-8}\text{m}^2$ . If the liquid flows inside the tube with a speed of



$0.15\text{mm}^{-1}$ , the speed with which the liquid is ejected through the holes is

A.  $50\text{ms}^{-1}$

B.  $5\text{ms}^{-1}$

C.  $0.05\text{ms}^{-1}$

D.  $0.5\text{ms}^{-1}$

**Answer: B**



**Watch Video Solution**

47. During an adiabatic process, the cube of the pressure is found to be inversely proportional to the fourth power of the volume. Then the ratio of specific heats is

A. 1

B. 1.33

C. 1.67

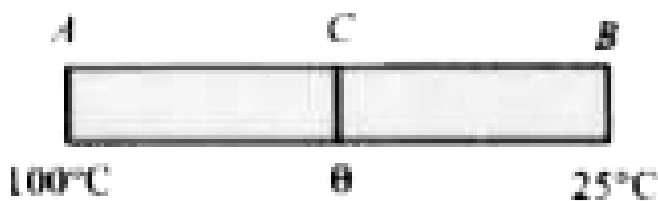
D. 1.4

**Answer: B**



Watch Video Solution

48. Two identical rods AC and CB made of two different metals having thermal conductivities in the ratio 2:3 are kept in contact with each other at the end C as shown in the figure. A is at  $100^{\circ}\text{C}$  and B is at  $25^{\circ}\text{C}$ . Then the junction C is at



A.  $55^{\circ}\text{C}$

B.  $60^{\circ}C$

C.  $75^{\circ}C$

D.  $50^{\circ}C$

**Answer: A**



**Watch Video Solution**

**49.**  $310J$  of heat is required to raise the temperature of 2 moles of an ideal gas at constant pressure from  $25^{\circ}C$  to  $35^{\circ}C$ . The amount of heat required to raise the

temperature of the gas through the same range at constant volume is

A. 384 J

B. 144 J

C. 276 J

D. 452 J

**Answer: B**



**Watch Video Solution**

50. A Carnot's engine operates with source at  $127^{\circ}C$  and sink at  $27^{\circ}C$ . If the source supplies 40 kJ of heat energy, the work done by the engine is

A. 30 kJ

B. 10 kJ

C. 4 kJ

D. 1 kJ

**Answer: B**



Watch Video Solution

51. The maximum particle velocity in a wavemotion is half the wave velocity. Then the amplitude of the wave is equal to

A.  $\frac{\lambda}{4\pi}$

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

C.  $\frac{\lambda}{2\pi}$

D.  $\lambda$

**Answer: A**



52. The ratio of the velocity of sound in hydrogen  $\left(\gamma = \frac{7}{5}\right)$  to that in helium  $\left(\gamma = \frac{5}{3}\right)$  at the same temperature is  $(\rho_1 : \rho_2 = 1 : 2)$

A.  $\sqrt{\frac{5}{42}}$

B.  $\sqrt{\frac{5}{21}}$

C.  $\frac{\sqrt{42}}{5}$

D.  $\frac{\sqrt{21}}{5}$



**Answer: C**



**Watch Video Solution**

**53.** An engine is moving towards a wall with a velocity  $50\text{ms}^{-1}$  emits a note of  $1.2\text{kHz}$ . Speed of sound in air =  $350\text{ms}^{-1}$ . The frequency of the note after reflection from the wall as heard by the driver of the engine is

A. 2.4 kHz

B. 0.24 kHz

C. 1.6 kHz

D. 1.2 kHz

**Answer: C**



**Watch Video Solution**

**54.** A glass tube is open at both the ends. A tuning fork of frequency  $f$  resonates with the air column inside the tube. Now the tube is placed vertically inside water so that half the length of the tube is filled with water. Now the

air column inside the tube is in unison with another fork of frequency  $f'$ . Then

A.  $f' = f$

B.  $f' = 4f$

C.  $f' = 2f$

D.  $f' = \frac{f}{2}$

**Answer: A**



**Watch Video Solution**

55. The surface temperature at the sun which has maximum energy emission at 500 nm is 6000 K. The temperature of a star which has maximum energy emission at 400 nm will be

A. 8500 K

B. 4500 K

C. 7500 K

D. 6500 K

**Answer: C**



Watch Video Solution

56. The volume of a nucleus is directly proportional to

(where  $A$  = mass number of the nucleus)

A.  $A$

B.  $A^3$

C.  $\sqrt{A}$

D.  $A^{\frac{1}{3}}$

**Answer: A**





Watch Video Solution

57. An electron is

A. Hardon

B. Baryon

C. a nucleon

D. a lepton

**Answer: D**



Watch Video Solution

**58.** Minority carriers in a p-type semiconductor are

A. free electrons

B. holes

C. neither holes nor free electrons

D. both holes and free electrons

**Answer: A**



**Watch Video Solution**

59. In a reverse biased diode when the applied voltage changes by 1 V, the current is found to change by  $0.5\mu A$ . The reverse bias resistance of the diode is

A.  $2 \times 10^5 \Omega$

B.  $2 \times 10^6 \Omega$

C.  $200 \Omega$

D.  $2 \Omega$

**Answer: B**



**Watch Video Solution**



60. 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. NOR

B. AND

C. XOR

D. NAND

**Answer: D**



**Watch Video Solution**