



# PHYSICS

## BOOKS - KCET PREVIOUS YEAR PAPERS

### MODEL TEST PAPER 3

#### Physics

1. Dimensions of light year is

A.  $LT^{-1}$

B. T

C. L

D. LT

**Answer: C**



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2. Obtain the value of specific heat of water in terms of  $Jkg^{-1}K^{-1}$ .

A.  $45^{\circ}C$

B.  $50^{\circ}\text{C}$

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

D.  $35^{\circ}\text{C}$

**Answer: B**



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**3.** Derive the expression for refractive index of the material of the prism in terms of angle of the prism and angle of minimum deviation.

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

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

C.  $\sqrt{2}$

D. none of these

**Answer: C**



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4. A person swimming at the bottom of a swimming pool looks up to the diving board.

The board.

A. Appears nearer

B. Appears at the correct position

C. Appears further

D. Is not seen at all

**Answer: C**



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**5. There are three Newton's laws of motion namely I, II and III : we can derive:-**

- A. Second and third law from the first law
- B. First and second law from third law
- C. Third and first law from the second law
- D. All the laws are independent of each other

**Answer: C**



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6. The length of a wire is increased by  $1\text{mm}$  on the application of a given load. If a wire of the same material, but of length and radius twice that of the first, on application of the same load, extension is

A.  $2\text{mm}$

B.  $4\text{ mm}$

C.  $0.5\text{ mm}$

D.  $0.25\text{ mm}$

**Answer: C**



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7. A car accelerates from rest at a constant rate for some time after which it decelerates at a constant rate  $\beta$  to come to rest. If the total time elapsed is  $t$ , the maximum velocity acquired by the car is given by :

A.  $\frac{\alpha + \beta}{\alpha\beta}$

B.  $\frac{\alpha^2 + \beta^2}{\alpha\beta}$

C.  $\frac{\alpha\beta}{\alpha + \beta}t$



D.  $\frac{\alpha^2 + \beta^2}{\alpha\beta}t$

**Answer: C**



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8. कोणीय संवेग का विमीय सूत्र होता है :

A.  $ML^2T^{-1}$

B.  $MLT^{-1}$

C.  $ML^3T^{-1}$

D.  $ML^3T^{-2}$

**Answer: A**



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9. An ideal gas of  $N$  molecules occupies a volume  $V$ . The average kinetic energy per molecule is  $u$ . If  $P$  denotes the pressure of the gas, then

A.  $P = 2u / 3$

B.  $P$  is independent of  $u$

C.  $P = 2Nu / 3V$

D. P cannot be determined from the data

**Answer: C**



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**10.** Coefficient of linear expansion of brass and steel rods are  $\alpha_1$  and  $\alpha_2$ . Length of brass and steel rods are  $l_1$  and  $l_2$  respectively. If  $(l_2 - l_1)$  is maintained same at all temperature, which one of the following relations holds good?

A.  $\alpha_1 l_2 = \alpha_2 l_1$

$$\text{B. } \alpha_1^2 l_2 = \alpha_2^2 l_1$$

$$\text{C. } \alpha_1 l_2^2 = a_1^2 = a_2 l_1^2$$

$$\text{D. } \alpha_1 l_1 = \alpha_2 l_2$$

**Answer: D**



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**11.** The thermo-electric power  $P$  of a thermocouple is given by

$$\text{A. } P = a\theta + b\theta^2$$

B.  $P = \theta^2 + b\theta^3$

C.  $P = a + 2b\theta$

D. none of these

**Answer: C**



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**12. Unit of self inductance is**

A. Faraday

B. Maxwell

C. Henry

D. Tesla

**Answer: C**



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**13.** A six volt battery is connected with a resistance. A current of 2 amperes flows for 4 minutes. Which of the following statements is wrong?

A. Resistance is  $3 \Omega$

B. Heat produced is 12 joules

C. Power consumed is 12 Watts

D. Charge flowed is 480 coulombs

**Answer: B**



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**14.** The galvanometer constant of a tangent galvanometer depends upon :

A.  $I = K \sin \theta$

B.  $I = K \tan \theta$

C.  $I = K \cos \theta$

D.  $I = K \cot \theta$

**Answer: B**



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**15.** A unit cube of copper and iron have

A. Same R and same  $\sigma$



B. Same R and different  $\sigma$

C. Different R and different  $\sigma$

D. Same  $\sigma$  and different R

**Answer: C**



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**16.** At very low temperature , a semi-conductor becomes

A. Conductor

B. Superconductor

C. Insulator

D. Inductor

**Answer: C**



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**17.** The resistance of a shunt which should be connected across a galvanometer of resistance  $2100 \Omega$ , so that only 5% of current passes through it is

A.  $220.5\Omega$

B.  $55.27\Omega$

C.  $110.5\Omega$

D.  $95.27\Omega$

**Answer: C**



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**18. What is a magnet ?**

- A.  $G$  shows deflection to the left and right  
with constant amplitude
- B.  $G$  shows no deflection
- C.  $G$  shows deflection on one side
- D.  $G$  shows deflection to the left and right,  
but the amplitude decreases steadily

**Answer: A**



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19. The susceptibility of a ferromagnetic substance is

A.  $600^{\circ}\text{C}$

B.  $54^{\circ}\text{C}$

C.  $237^{\circ}\text{C}$

D.  $327^{\circ}\text{C}$

**Answer: D**



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20. Mention the SI unit of magnetising field.

A. Absolute permeability

B. Susceptibility

C. Relative permeability

D. Retentivity

**Answer: A**



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21. The electric flux of a surface enclosing an electric dipole is

A. Maximum

B. Zero

C. Maximum or zero

D. None of these

**Answer: B**



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22. A line joining places of equal declinaiton is called

A. Isoclinic

B. Isogonic

C. Agonic

D. Isodynamic

**Answer: B**



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23. Give an example for a ferromagnetic substance.

A. Aluminum

B. Gold

C. Nickel

D. Copper

**Answer: C**



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24. The unit of magnetic induction  $B$  in SI is :

A. A/m

B. Weber

C. Am

D. Tesla

**Answer: D**



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25. Light waves can be polarised as they are

A. Have high frequencies

B. Are transverse

C. Have short wavelength

D. Can be reflected

**Answer: B**



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**26. Which one of the following is true?**

A. Mercury light

B. Sodium light

C. White light

D. Neon light

**Answer: B**



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27. Two monochromatic coherent point sources  $S_1$  and  $S_2$  are separated by a distance  $L$ . Each source emits light of wavelength  $\lambda$ , where  $L \gg \lambda$ . The line  $S_1S_2$  when

extended meets a screen perpendicular to it at point A. Then

A. The interference fringes on the screen are circular in shape

B. The point  $A$  is an intensity maximum if  $L = n \lambda$  ( $n = \text{integer}$ ).

C. The interference fringes on the screen are straight lines perpendicular of the lines  $S_1 S_2 A$

D. both (a) & (b)

**Answer: D**



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**28.** A source of sound gives five beats per second when sounded with another source of frequency  $100s^{-1}$ . The second harmonic of the source together with a source of frequency  $205s^{-1}$  gives five beats per second. What is the frequency of the source?

A.  $100s^{-1}$

B.  $205s^{-1}$

C.  $105s^{-1}$

D.  $95s^{-1}$

**Answer: C**



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**29.** Two identical stringed instruments have a frequency of 100 Hz. The tension in one of them is increased by 1 %. If they are now

sounded together the number of beats produced is

A. 1

B. 4

C. 8

D. 2

**Answer: D**



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30. Speed of sound in a gas is  $v$  and *rms* velocity of the gas molecules is  $c$ . The ratio of  $v$  to  $c$  is

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

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

C.  $\sqrt{\frac{3}{\gamma}}$

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

**Answer: D**



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31. A source frequency  $f$  gives  $t$  beats when sounded with a frequency  $200\text{Hz}$ . The second harmonic of same source gives 10 beats when sounded with a source of frequency  $420\text{Hz}$ .

The value of  $f$  is

A.  $105\text{s}^{-1}$

B.  $200\text{s}^{-1}$

C.  $210\text{s}^{-1}$

D.  $195\text{s}^{-1}$

**Answer: A**



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32. In a parallel arrangement if ( $R_1 > R_2$ ), then the power dissipated in resistance  $R_1$  will be

- A. Less than  $R_2$
- B. More than  $R_2$
- C. Same as  $R_2$
- D. None of these

**Answer: A**



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**33.** A uniform insulating rod of length  $L$  moves with a velocity  $\bar{v}$  in a magnetic field  $B$  where  $\bar{v}$  is perpendicular to both  $L$  and  $B$ . Then the induced EMF at the ends of the rod is given by

A.  $BL v$

B.  $2BL v$

C.  $BL$

D.  $B^2 L v$

**Answer: A**



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**34.** Energy required to store a current line an inductor  $L$  is

A.  $1/2(LI^2)$

B. 0

C.  $1/2(IL^2)$

D.  $IL^2$

**Answer: A**



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**35.** In a  $LCR$  circuit having  $L = 8.0$  henry,  $C = 0.5\mu F$  and  $R = 100$  ohm in series. The resonance frequency in per second is

- A. 600 radian
- B. 500 radian
- C. 600 Hertz
- D. 500 Hertz

**Answer: B**



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**36.** L, C and R represent the physical quantities inductance, capacitance and resistance respectively. The combinations which have the dimensions of frequency are-

A.  $1/RC$

B.  $C/L$

C.  $R/L$

D. None of these

**Answer: C**



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**37.** The number of turns in the primary and secondary turns of a transformer are 1000 and 3000 respectively. If 80 volt A.C. is applied to the primary coil of the transformer, then the potential difference per turn of the secondary coil would be



A. 240 volt

B. 0.24 volt

C. 2400 volt

D. 0.08 volt

**Answer: D**



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**38.** The photoelectric threshold frequency for potassium is  $3 \times 10^{14}$  Hz. The work function for potassium is ( $h = 6.625 \times 10^{-34} Js$ )

A. 50 nm

B. 60 nm

C. 500 nm

D. 600 nm

**Answer: A**



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**39.** Which of the following are not electromagnetic waves ?

A. Energy

B. Frequency

C. Wavelength

D. Velocity

**Answer: D**



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**40.** A transistor is used as

A. An oscillator

B. A detector

C. An amplifier

D. All of these

**Answer: D**



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**41.** Half-life of a radioactive sample is 200 days.

Its decay constant is

A. 138.6/day

B.  $3.465 \times 10^{-3}/\text{day}$

C.  $0.005/\text{day}$

D.  $3.545 \times 10^{-2}/\text{day}$

**Answer: B**



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**42.** P-type semi-conductor is

A. The concentration of holes increases while that of conduction electrons

remains constant

B. The concentration of holes remains constant while that of conduction electron increases

C. The concentration of holes increases while that of conduction electrons decreases

D. The concentration of both holes and conduction electrons increases

**Answer: A**



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43. Which one of the following is true?

A.  $\alpha$  - rays

B.  $\gamma$  - rays

C.  $\beta$ - rays

D. X- rays

**Answer: B**



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44. In young's double slit experiment, if the distance between the slits is halved and the distance between the slits and the screen is doubled, the fringe width becomes

A. Unchanged

B. Double

C. Half

D. Four times

**Answer: D**





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**45.** The total magnification produced by a compound microscope is 20. The magnification produced by the eye piece is 5. The microscope is focussed on a certain object. The distance between the objective and eyepiece is observed to be 14cm. If the least distance of distinct vision is 20cm, calculate the focal length of the objective and the eye piece.

A.  $f_0 = 80$  cm and  $f_e = 20$  cm

B.  $f_0 = 95$  cm and  $f_e = 5$  cm

C.  $f_0 = 50$  cm and  $f_e = 50$  cm

D.  $f_0 = 5$  cm and  $f_e = 95$  cm

**Answer: B**



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**46.** If  $C$  is the critical angle for a medium and  $\mu$  is its refractive index, then

A.  $\mu = \cot C$

B.  $\mu = \tan C$

C.  $\mu = \operatorname{cosec} C$

D.  $\mu = \sec C$

**Answer: C**



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**47.** Which of the following relation hold good for refraction between a pair of media with

$i_1$  and  $i_2$  as angles incidence and refraction

$v_1$  and  $v_2$  as velocities of light in the media ?

A.  $v_2 \sin i_1 = v_1 \sin i_2$

B.  $v_1 \cos i_1 = v_2 \cos i_2$

C.  $v_1 \operatorname{cosec} i_1 = v_2 \operatorname{cosec} i_2$

D.  $v_1 \sec i_1 = v_2 \sec i_2$

**Answer: C**



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**48.** A galvanometer of resistance  $25\Omega$  gives full scale deflection for a current of 10 milliampere , is to be changed into a voltmeter of range 100 V by connecting a resistance of ' R ' in series with galvanometer. The value of resistance R in  $\Omega$  is

A. 1000

B. 975

C. 10025

D. 9975

**Answer: D**



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**49.** A moving charge produces

- A. Electric field only
- B. Magnetic field only
- C. Both electric and magnetic field
- D. Both electric and magnetic field

**Answer: C**



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50. Two free parallel wires carrying currents in opposite direction

A. Attract each other

B. Do not affect each other

C. Repel each other

D. Get rotated, to be perpendicular to each other

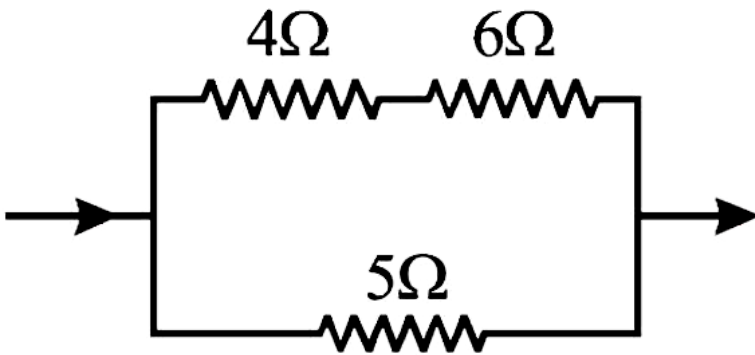
**Answer: C**



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**51.** In the circuit shown in fig the heat produced in the 5 ohm resistor due to the current flowing through it is 10 calories per second.





The heat generated in the 4 ohms resistor is

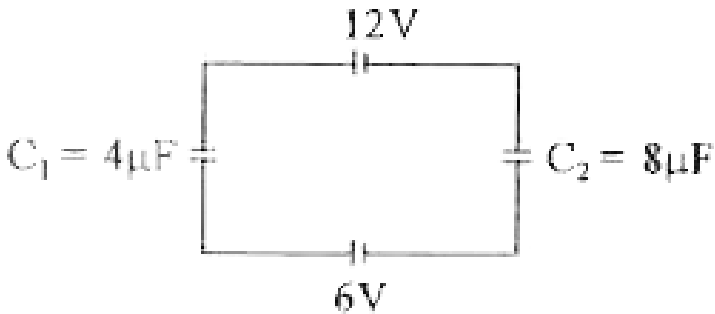
- A. 1 calorie/sec
- B. 3 calories/sec
- C. 2 calories/sec
- D. 4 calories per sec

**Answer: C**



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52. In the circuit shown



A. 50 amp

B. 2 amp

C. 0.5 amp

D.  $(10/9)$  amp

**Answer: D**



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**53.** When cells are arranged in parallel

- A. The current capacity decreases
- B. The e.m.f. increases
- C. The current capacity increases
- D. The e.m.f. decreases

**Answer: C**



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54. The maximum velocity of a particle executing S.H.M is  $0.08 \text{ ms}^{-1}$ . If its maximum acceleration is  $0.32 \text{ m/s}^2$ . Its period and amplitude are given by

A.  $\pi \text{ sec}$ ,  $0.01 \text{ m}$

B.  $2\pi \text{ sec}$ ,  $0.02 \text{ m}$

C.  $\frac{\pi}{2} \text{ sec}$ ,  $0.02 \text{ m}$

D.  $\frac{\pi}{3} \text{ sec}$ ,  $0.02 \text{ m}$

**Answer: C**



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**55.** The equation of a transverse wave is given by  $y = 20 \sin \pi(0.02x - 2t)$  where  $y$  and  $x$  are in cm and  $t$  is in sec. The wavelength in cm will be

A. 200 cm/sec

B. 0.5 cm/sec

C. 400 cm/sec

D. 20 cm/sec

**Answer: C**



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**56.** Quality of a sound depends upon its

A. Amplitude but not on frequency

B. Frequency but not on amplitude

C. Amplitude and frequency both

D. Neither amplitude nor frequency

**Answer: C**



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57. 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.  $v/2l$  hertz

B.  $v/l$  hertz

C.  $v/4l$  hertz

D.  $2v/l$  hertz

**Answer: C**



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**58.** Condenser  $A$  has a capacity of  $15\mu F$  when it is filled with a medium of dielectric constant 15. Another condenser  $B$  has a capacity  $1\mu F$  with air between the plates. Both are charged separately by a battery of  $100V$ . After charging, both are connected in parallel



without the battery and the dielectric material being removed. The common potential now is

A. 400 V

B. 1200 V

C. 800 V

D. 1600 V

**Answer: C**



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59. For a given surface the Gauss's law is stated as  $\oint \vec{E} \cdot d\vec{A} = 0$ . From this we can conclude that

A. E is necessarily zero on the surface

B. The total flux, through the surface, is zero

C. E is perpendicular to the surface at every point

D. The flux is only going out of the surface

**Answer: B**



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**60.** When air is replaced by a dielectric medium of constant  $K$ , the capacity of the condenser.

- A. Remains unchanged
- B. Decreases  $K$  times
- C. Increases by  $K^2$  times
- D. Increases  $K$  times

**Answer: D**



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