



PHYSICS

BOOKS - KCET PREVIOUS YEAR PAPERS

MODEL TEST PAPER 6

Physics

1. With usual notation $[i-j \ j-k \ k-i] =$

A. $V e = \sqrt{Rg}$

B. $V = \sqrt{2Rg}$

C. $V = \sqrt{Rg/2}$

D. None of the above

Answer: C



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2. Two bullets A and B of masses 10 gm and 20 gm moving with velocities 20m/s and 10 m/s respectively, strike a mud wall. Which one of the bullets will pierce more?

A. A

B. A and B pierce equally

C. B

D. A or B depending on the wall

Answer: A



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3. Two bodies of masses m_1 and m_2 have equal KE . Their momenta is in the ratio

A. $m_1 m_2$

B. $\sqrt{m_1} : \sqrt{m_2}$

C. $m_2 : m_1$

D. $\sqrt{m_2} : \sqrt{m_1}$

Answer: B



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4. A stone is let fall from the top of a tower 60 m high and at the same time another is

projected vertically upwards with a velocity of 20 m/s. The two will meet after

A. 1 sec

B. 3 sec

C. 2 sec

D. 4 sec

Answer: B



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5. A particle starts with a velocity of 150 cm/s and moves in a straight line with a retardation of 10 cm/s^2 . How long does the particle take to pass through the initial point?

A. 15 sec

B. 45 sec

C. 30 sec

D. None of these

Answer: A



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6. What are the modifications that are observed in birds, that help them fly?

A. Density of air decreases with height

B. Earth acts like a mirror

C. Density of air increases with height

D. Air is dense uniformly

Answer: C



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7. A swimmer is inside a tank. Suppose that the surface is calm, the swimmer when looking up sees the outside in an angular separation of

A. 40°

B. 98°

C. 90°

D. 101°

Answer: B



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8. Two lenses of power +2D and -5D are kept in contact. The focal length of the combination is

A. $-1/3\text{m}$

B. 3 m

C. $1/3\text{ m}$

D. -3m

Answer: A



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9. A lens of power $+2\text{D}$ and lens of power -1D are kept in contact. The combination behaves as a lens of power

A. $+3\text{D}$

B. $+1\text{D}$

C. -3D

D. -1D

Answer: B



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10. In propagation of electromagnetic waves, what is the angle between the direction of propagation of the wave and the plane of polarisation?

A. 45° and 45°

B. 90° and 90°

C. 45° and 90°

D. 90° and 45°

Answer: B



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11. When light incident on a refracting surface, is polarized to a maximum extent, by reflection, then the angle between the reflected and refracted rays is

A. 45°

B. 90°

C. 48°

D. 98°

Answer: B



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12. The planes of vibration and polarization are

- A. Orthogonal
- B. Non-existent
- C. Parallel
- D. Both (a) and (c)

Answer: A



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13. When light passes through a nicol prism, the extraordinary ray is

- A. Refracted
- B. Passes straight
- C. Reflected
- D. None of the above

Answer: A



14. In calcite crystal, double refraction does not take place

- A. Perpendicular to optic axis
- B. Both (a) and (c)
- C. Parallel to optic axis
- D. Transversely

Answer: B



15. The expression relating polarising angle and refractive index is

A. $\mu \sin i_p = 1$

B. $\mu \tan i_p$

C. $\mu \cot i_p = 1$

D. $\mu \cos i_p = 1$

Answer: C



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16. Waves that cannot be polarised are

A. Longitudinal

B. Electromagnetic

C. Transverse

D. Light

Answer: A



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17. What is the wavelength range of X-rays ?

A. Greater than that of visible light

B. Greater or lesser, depending on the source

C. Lesser than that of visible light

D. None of the above

Answer: A



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18. A tuning fork A produces 4 beats per second with another tuning fork B of frequency 320 Hz. On filing one of the prongs of A, 4 beats per second are again heard when sounded with the same fork B. Then the frequency of the fork A before filing is

A. 256

B. 254

C. 261

D. 251

Answer: D



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19. The temperature in $^{\circ}C$ at which the velocity of sound in air is half its value at $0^{\circ}C$ is

A. + 204.75

B. - 204.75

C. 0.5

D. - 273

Answer: B



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20. Resistance of a conductor depends on its

- A. Its harmonics only
- B. The instruments producing it
- C. Its fundamental frequency only
- D. Its amplitude

Answer: C



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21. Sperms are produced in

- A. At the nodes
- B. None of the above
- C. At the antinodes
- D. At all points

Answer: C



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22. When the listener moves towards a stationary source with a velocity V_L , the apparent frequency of a note emitted by the source is f' . When the listener moves away from the source with the same velocity, the apparent frequency of the note is f . Given $f' / f = 3$ and V as the velocity of sound in air, the value of $\frac{V}{V_L}$ is

A. 3

B. 2

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

D. 1

Answer: B



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23. The disc of a Siren has n holes and the frequency of its rotation is 300 r.p.m. It produces a note of wavelength 2.4m., when the velocity of sound in air is 360 m/s. The value of n is

A. 30

B. 36

C. 5

D. 24

Answer: A



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

B. 3

C. 1

D. 2

Answer: D



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25. For a particle executing simple harmonic motion, the kinetic energy K is given by,

$$K = K_0 \cos^2 \omega t$$

The maximum value of potential energy is :

- A. At the mean position
- B. At the extreme positions of its swing
- C. None of the above
- D.

Answer: A



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26. If the half-life of a radioactive sample is 10 hours its mean life is

A. 14.4 hours

B. 20 hours

C. 7.2 hours

D. 6.93 hours

Answer: D



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27. The rest mass of a photon of wavelength λ is

A. 0

B. Between 0 and ∞

C. ∞

D. Equal to that of an electron

Answer: A



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28. When ${}_{.92}U^{235}$ undergoes fission, 0.1 % of its original mass is changed into energy. How much energy is released if 1kg of ${}_{.92}U^{235}$ undergoes fission ?

A. $9 \times 10^{10} J$

B. $9 \times 10^{12} J$

C. $9 \times 10^{11} J$

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

Answer: D



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29. An X-ray machine has an accelerating potential difference of 25,000 volt. By calculating the shortest wavelength will be obtained as :

($h = 6.62 \times 10^{-34}$ J-sec, $e = 1.6 \times 10^{-19}$ coulomb)

A. 0.25 Å

B. 1.00 Å

C. 0.50 Å

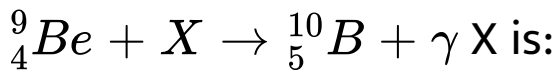
D. 2.50 Å

Answer: C



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30. In the reaction :



A. 19/81

B. 15/16

C. 20/53

D. 10 / 11

Answer: D



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31. What is immeterial for an electric fuse wire ?

A. It's specific resistance

B. It's length

C. It's radius

D. Current flowing through it

Answer: B



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32. An electric fan and a heater are marked as 100 watt 220 volts and 1000 watt 200 volts respectively. The resistance of heater is

A. Zero

B. Less than that of the fan

C. Greater than that of the fan

D. Equal to that of the fan

Answer: B



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33. The magnetic induction at a point P which is at the distance 4 cm from a long current carrying wire is $10^{-3}T$. The field of induction at a distance 12 cm from the current will be

A. $3.33 \times 10^{-4}T$

B. $3 \times 10^{-3}T$

C. $1.11 \times 10^{-4}T$

D. $9 \times 10^{-3}T$

Answer: A



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34. The average e.m.f. induced in a coil in which the current changes from 2 ampere to 4

ampere in 0.05 second is 8 volt . What is the self inductance of the coil ?

A. 0.1 H

B. 0.4 H

C. 0.2 H

D. 0.8 H

Answer: C



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35. In a full wave rectifier circuit operating from 50Hz mains frequency, the fundamental frequency in the ripple would be

A. 25 Hz

B. 50 Hz

C. 70.7 Hz

D. 100 Hz

Answer: B



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36. An alternating voltage E (in volts)
 $= 200\sqrt{2}\sin(100t)$ is connected to a 1
microfarad capacitor through an a.c.ammeter.

The reading of the ammeter shall be

A. $10mA$

B. $40mA$

C. $20mA$

D. $80mA$

Answer: C



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37. In a series circuit

$$R = 300\Omega, L = 0.9H, C = 2.0\mu F, \omega = 1000$$

rad/s. The impedance of the circuit is

A. 1300Ω

B. 500Ω

C. 900Ω

D. 400Ω

Answer: B



38. An L.C.R series circuit consist of $R = 25\Omega$ and the reactances of C and L is 12Ω and 24Ω respectively. The impedance of the circuit is

A. 21Ω

B. 13Ω

C. 27.5Ω

D. 5Ω

Answer: C



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39. A conductor of length 10cm is moved parallel to itself with a speed of $10\frac{m}{s}$ at right angle to a uniform magnetic field of $10^{-4}\text{wb}/\text{m}^2$. What is the e.m.f. induced in it?

A. 10^{-2} volt

B. 10^{-1} volt

C. 10^{-4} volt

D. 10^{-3} volt

Answer: C



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40. The plate resistance of triode value is $3 \times 10^3 \Omega$ and its mutual conductance is $1.5 \times 10^{-3} \Omega^{-1}$. The amplification factor of the triode is

A. 5×10^{-5}

B. 0.45

C. 4.5

D. 2×10^6

Answer: C



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41. The impedance of a circuit consists of resistance 3 ohm and 4 ohm reactance . The power factor of the circuit is

A. 0.4

B. 0.8

C. 0.6

D. 1

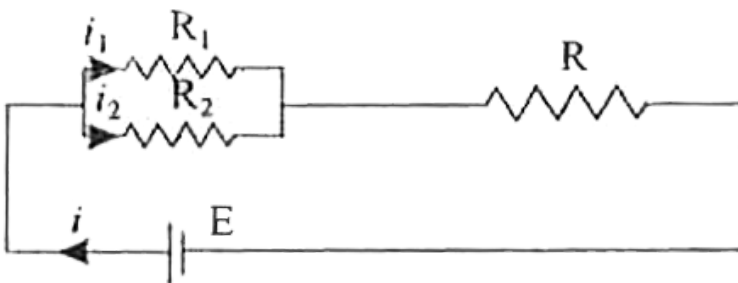
Answer: C



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42. In the following circuit, current ratio i_1 / i_2

depends upon



A. R_1 , R_2 and R

B. R and R_2 only

C. R_1 and R_2 only

D. E and R only

Answer: C



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43. Two thin long parallel wires separated by a distance 'b' carry a current ' i ' ampere each, the

magnitude of force per unit length exerted by one wire on the other is

A. $\frac{\mu_0 i^2}{b^2}$

B. 1

C. $\mu_0 i$

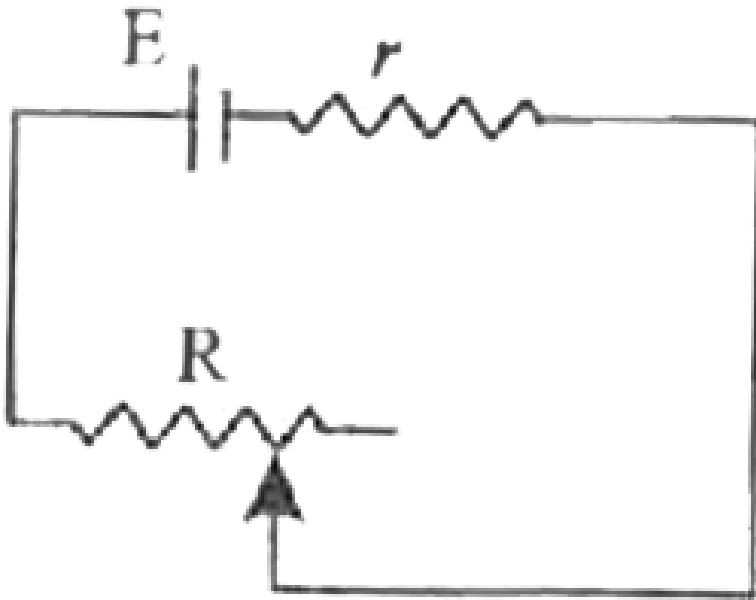
D. $\frac{\mu_0 i^2}{2\pi b}$

Answer: D



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44. A battery of e.m.f. E and internal resistance r is connected to variable resistance R as shown here. Which one of the following is true?



A. Potential difference across the terminals of the battery is maximum when $R = r$

B. Current in the circuit is maximum when $R = r$

C. Power delivered to resistor is maximum when $R = r$

D. Current in the circuit is maximum when $R > r$

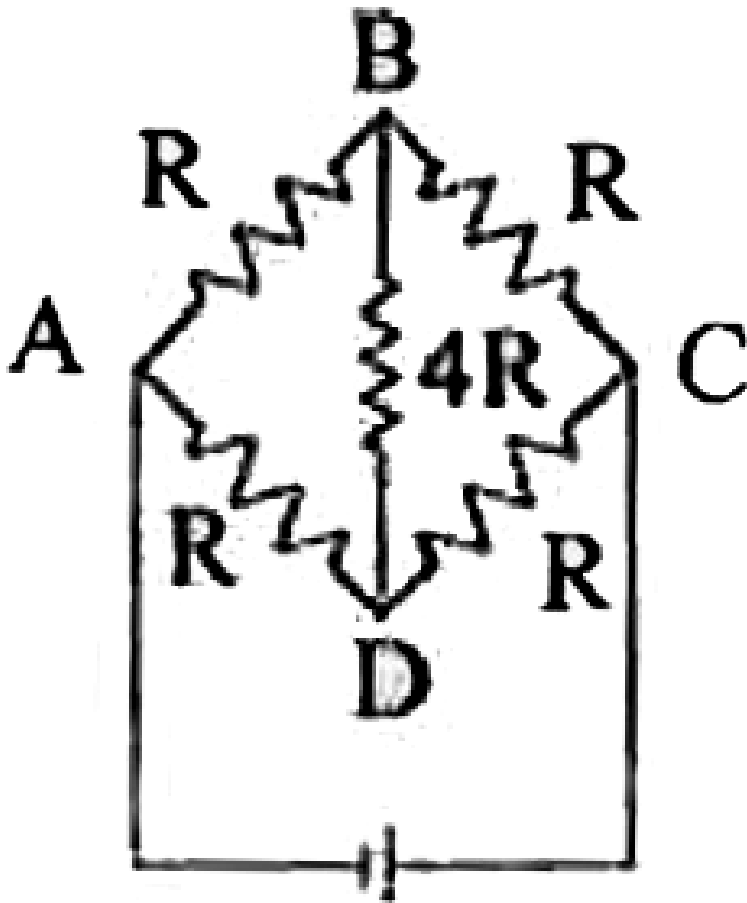
Answer: C



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45. Five resistance of given values are connected together as shown in the figure.

The current in the arm BD will be



A. Half the current in the arm ABC

B. Twice the current in the arm ABC

C. Zero

D. Four times the current in the arm ABC

Answer: C



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46. A student has 10 resistors of resistance ' r '.

The minimum resistance made by him with given resistors is

A. $10r$

B. $\frac{r}{100}$

C. $\frac{r}{10}$

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

Answer: C



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47. An electron of mass m , when accelerated through a potential difference V , has de Broglie wavelength λ . The de Broglie wavelength associated with a proton of mass

M , accelerated through the same potential difference, will be

A. $\lambda \left(\frac{M}{m} \right)$

B. $\lambda \sqrt{\frac{M}{m}}$

C. $\lambda \left(\frac{m}{M} \right)$

D. $\lambda \sqrt{\frac{m}{M}}$

Answer: D



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48. which a U^{238} nucleus original at rest , decay by emitting an alpha particle having a speed u , the recoil speed of the residual nucleus is

A. $4v / 238$

B. $v / 4$

C. $-4v / 238$

D. $-4v / 234$

Answer: D



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49. A radioactive substance disintegrate as follows: ${}_{92}\text{X}^{234} \rightarrow {}_{87}\text{Y}^{222}$ The number of α and β particle emitted from this reaction is

A. 3 & 5

B. 3 & 3

C. 5 & 3

D. 3 & 1

Answer: D





50. An electron having energy $10eV$ is circulating in path of radius $0.1m$ having magnetic field 1.0×10^{-4} Tesla, the speed of the electron will be

A. $1.9 \times 10^6 m / s$

B. $1.9 \times 10^{12} m / s$

C. $3.8 \times 10^6 m / s$

D. $3.8 \times 10^{12} m / s$

Answer: A



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51. In intrinsic semiconductor at room temperature, the number of electrons and holes are

A. Equal

B. Unequal

C. Zero

D. Infinity

Answer: A



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52. X-rays are a stream of

A. Electrons

B. Photons

C. Phonons

D. Protons

Answer: B



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53. In an semiconductor the separation between conduction band and valence band is of the order of

A. 100 eV

B. 1 eV

C. 10 eV

D. 0 eV

Answer: B



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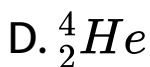
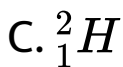
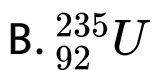
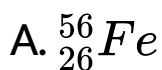
54. The depletion layer in $P - N$ junction region is caused by

- A. Drift of holes
- B. Migration of impurity ions
- C. Diffusion of carriers
- D. Drift of electrons

Answer: D



55. If the total binding energies of ${}^1_1H^2$, ${}^2_2He^4$, ${}^{56}_{26}Fe$ and ${}^{235}_{92}U$ nuclei are 2.22, 28.3, 492 and 1786 MeV respectively, identify the most stable nucleus out of the following



Answer: D



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56. The nucleus of an atom of tritium in its ground state undergoes radioactive decay according to ${}_1H^3 \rightarrow {}_2He^3$, yielding an ion of He^3 . In this case which of the following is not correct.

A. The radius of the bohr orbit of the electron increases

B. The total energy of the electron decreases

C. The kinetic energy of the orbiting electron increases

D. The orbital angular momentum of the electron about the nucleus does not change.

Answer: A



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57. Equivalent energy of mass equal to 1 a.m.u.
is

A. 931 KeV

B. 931 MeV

C. 931 eV

D. 931 Joules

Answer: B



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58. When the electron jumps from a level $n = 4$ to $n = 1$, momentum of the recoiled hydrogen atom will be

A. $6.8 \times 10^{-27} \text{ kg} \times \text{m} / \text{s}$

B. $13.6 \times 10^{-19} \text{ kg} \times \text{m} / \text{s}$

C. $13.75 \times 10^{-19} \text{ kg} \times \text{m} / \text{s}$

D. Zero

Answer: D



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59. The work function for a metal for which threshold wavelength is $6.6 \times 10^{-5} m$, is

A. $1.875 \times 10^{-12} \text{ eV}$

B. $2 \times 10^{-29} \text{ eV}$

C. $3 \times 10^{-21} \text{ Joules}$

D. $6.25 \times 10^{-21} \text{ eV}$

Answer: C



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60. When NPN transistor is used as an amplifier

- A. Electrons move from base to collector
- B. Electrons move from collector to base
- C. Electrons move from emitter to base
- D. Holes move from base to emitter

Answer: A



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