PHYSICS

BOOKS - KCET PREVIOUS YEAR PAPERS

MODEL TEST PAPER 4

Physics

1. Why the amount of light emitted by the fluorescent tubes is much larger as compared to the filament lamps ?

A. Tube contains gas at low temperature

B. Light is diffused through the walls of the tube

C. ultraviolet light is converted into visible light by fluorescence

D. It consumes more power than bulb

Answer: C

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2. A proton is accelerated through a potential difference of 1 V. Its energy is

A. 1 eV

B. 2 eV

C. 0

D. 4 eV

Answer: A

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3. The ratio of the inertial mass to gravitational mass is equal to

A. $1/2$

B. 2

C. 1

D. no fixed number

Answer: D

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4. The ratio of maximum height reached by a particle projected under gravity to its horizontal range is $1:4$ The angle of projection initially is

A. 90°

B. 37°

C. 60°

D. 45°

Answer: D

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5. A pressure of $10^6 \quad \mathrm{dyne}/cm^2$ is equivalent to

:

A. $10^5 n/m^2$

B. $10^6 n/m^2$

C. $10^4 n/m^2$

D. $10^7 n/m^2$

Answer: A

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6. A hydrogen atom is in p state. For this, values of j are

A. $+\frac{1}{2}, +\frac{3}{4}$

B. $\frac{7}{2}, \frac{3}{2}, \frac{1}{2}$

C. $-\frac{3}{2}, -\frac{1}{2}$

D. $-\frac{1}{2}, \frac{1}{2}, \frac{3}{2}$

Answer: A

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7. Post office box is a device for measuring resistances based on the principle of :

A. Producing a beam of white light

B. Producing a beam of high intensity in coherent light

C. Producing a beam of monochromatic and coherent light

D. Producing a beam of highly penetrating X-rays

Answer: C

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8. The refractive index of glass is 1.50 and the speed of light in air is $3 \times 10^8 m/s$. Calculate the speed of light in glass.

A. $24.2Å$

B. $3.92Å$

C. $2.42Å$

D. 3.992×10^7 cm

Answer: C

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9. If the distance between nuclei is 2×10^{-10} cm. The density of nuclear material is

A. $3.2 \times 10^{-12} \mathrm{kg.m}^3$

B. $1.6 \times 10^{-2} \mathrm{k/m}^2$

C. $2.98 \times 10^7 \mathrm{kg/m}^3$

D. $4 \times 10^{17} \mathrm{kg/m}^2$

Answer: D

10. The mass number of a nucleus is

A. always less than its atomic number

B. sometimes more that and sometimes equal to its atomic number

C. Sometimes equal to its atomic number

D. Both (b) and (c)

Answer: D

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11. In the reaction represented by,

$$_{Z}{}^{A}X \rightarrow \cdot\, _{Z-2}{}^{A-4}Y \rightarrow \cdot\, _{Z-2}{}^{A-4}Y \rightarrow \cdot\, _{Z-1}{}^{A-4}K$$

the decays in the sequence are a)α, β, γ b) β, γ, α c)γ, α, β d)α, γ, β

A. α, β, γ

B. γ, α, β

C. β, γ, β

D. α, γ, β

Answer: D

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12. The relation between half-life T of a radioactive sample and its mean life $\tau$is:

A. $T = 0.693\tau$

B. $\tau = T$

C. $\tau = 0.693T$

D. $\tau = 2.718T$

Answer: A

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13. if the electron in hydrogen orbit jumps form third orbit to second orbit, the wavelength of the emitted radiation is given by

A. $\lambda = 36/5R$

B. $\lambda = 5/R$

C. $\lambda = 5R/36$

D. $\lambda = R/6$

Answer: C

14. The radius of the first orbit of electron in hydrogen atom `(e=1.6xx10^(-19)" coulomb,

A. $53Å$

B. $0.53Å$

C. 5.3Å

D. $53 \times 10^2 \text{Å}$

Answer: B

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15. The frequency range of ultraviolet radiation is

A. $3 \times 10^3 Hz$

B. $7.5 \times 10^{12} Hz$

C. $6 \times 10^{10} Hz$

D. $1.5 \times 10^{13} Hz$

Answer: D

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16. Light of wavelength 4700Å is incident on a metal plate whose work function is 2 eV. Then maximum kinetic energy of the emitted photoelectron would be

A. 2.0 eV

B. 1.1 eV

C. 1.5 eV

D. 0.5 eV

Answer: B

17. Threshold wavelength for photoelectric emission from a metal surface is 5200 A. Photoelectrons will be emitted when this

surface is illuminated with monochromatic radiation from

A. 50 watt infrared lamp

B. 50 watt ultraviolet lamp

C. 1 watt infrared lamp

D. 10 watt infrared lamp

Answer: B

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18. In frequency modulated wave

A. Amplitude varies with time

B. Amplitude and freuency both vary with time

C. Frequency varies with time

D. Amplitude and frequesncy both are constant

Answer: C

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19. When a $p-n$ junction diode is reverse biased, the flow of current across the junction is mainly due to

A. Height of the potential barrier is reduced

B. Electrons and holes move towards each other and towards the depletion region

C. Width of depletion region is reduced

D. All the above

Answer: D

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20. Two coils of self-inductance L_1 and L_2 are placed closed to each other so that total flux in one coil is completely linked with other. If M is mutual inductance between them, then

A. $M = L_1 L_2$

B. $M = (L_1 L_2)^2$

C. $M = L_1 / L_2$

D. $M = \sqrt{(L_1 L_2)}$

Answer: D

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21. What is the order of drift velocity of electrons?

A. 2×10^{-6}

B. 2×10^{-5}

C. 2×10^{-8}

D. 2×10^{-10}

Answer: D

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22. The wings of an aeroplane are $I0m$ apart. The plane is moving horizontally towards the north with a velocity of $200m/\sec$ at a place where the vertical component of earth's magnetic field is $0.5 \times I0^{-4}T$. The induced emf set up between the tips of the wings is

A. 0.01 V

B. 1 V

C. 0.1 V

D. 10 V

Answer: C

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23. The natural frequency of a L - C circuit is equal to

A. $\pi\sqrt{(LC)}$

B. $1/2\pi\sqrt{(L/C)}$

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

D. $1/2\pi\sqrt{(C/L)}$

Answer: C

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24. A 100 pF capacitor is connected to a 230 V, 50 Hz a.c. source, the r.m.s. value of the conduction current is

A. 1.90 A

B. 0.90 A

C. 6.28 A

D. 10.14 A

Answer: B

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25. A step up transformer operates on a $230V$ line and a load current of 2 ampere. The ratio of

the primary and secondary windings is $1:25$. What is the current in the primary?

A. 12.5 amp

B. 8.8 amp

C. 50 amp

D. 25 amp

Answer: C

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26. A straight conductor of length 0.4 m is moved with a speed of 7 m/s perpendicular to the magnetic field of intensity of $0.9Wb/m^2$. The induced e.m.f. across the conductor will be

A. $5.04V$

B. $2.52V$

C. $1.26V$

D. $25.2V$

Answer: B

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27. Best method to increase the sensitivity of the moving coil galvanometer is to increase :

A. The suspension wire should be made stiff

B. The magnetic field should be increased

C. Area of the coil should be reduced

D. The number of turns in the coil should be reduced

Answer: C

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28. The hysteresis cylcle for the material of a permanent magnet is

A. Short and wide

B. Tall and wide

C. Tall and narrow

D. Short and narrow

Answer: C

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29. The magnetic moment of atomic neon is

A. zero

B. μ_B

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

D. $3/2\mu_B$

Answer: A

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30. The radius of curvature of the path of the charged particle in a uniform magnetic field is directly proportional to

A. The charge on the particle

B. The energy of the particle

C. The momentum of the particle

D. The intensity of the field

Answer: C

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31. An electric bulb is rated 220 volt - 100 watt. The power consumed by it when operated on 110 volt will be

A. 50 watt

B. 90 watt

C. 75 watt

D. 25 watt

Answer: D

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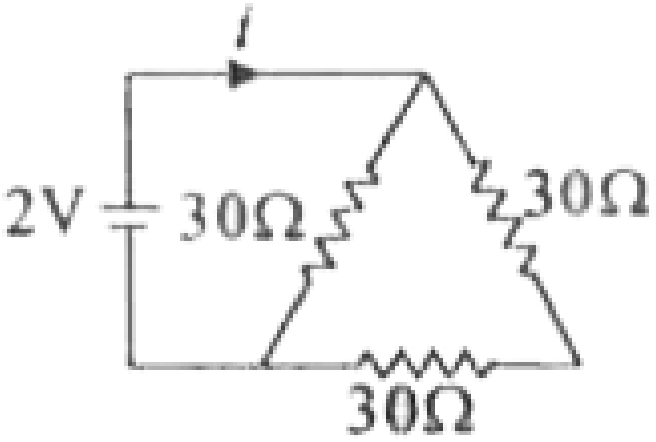
32. The current in the circuit (see fig) is



A. 1/45 amps

B. 1/10 amps

C. 1/15 amps

D. 1/5 amps

Answer: B

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33. Dry ice is

A. Zinc

B. Ammonium chloride

C. Supphuric acid

D. Manganese dioxide

Answer: C

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34. A charged particle of mass m and charge q is released from rest in an electric field of constant magnitude E. The kinetic energy of the particle after time t is

A. $\frac{2E^2t^2}{mg}$

B. $\frac{E^2q^2t^2}{2m}$

C. $\frac{Eq^2m}{2t^2}$

D. $\frac{Eqm}{2t}$

Answer: C

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35. 64 small drops of mercury, each of radius r and charge q coalesce to form a big drop the ratio of the surface density of charge of each small drop with that of the big drop is

A. 1000

B. 100

C. 200

D. 1

Answer: B

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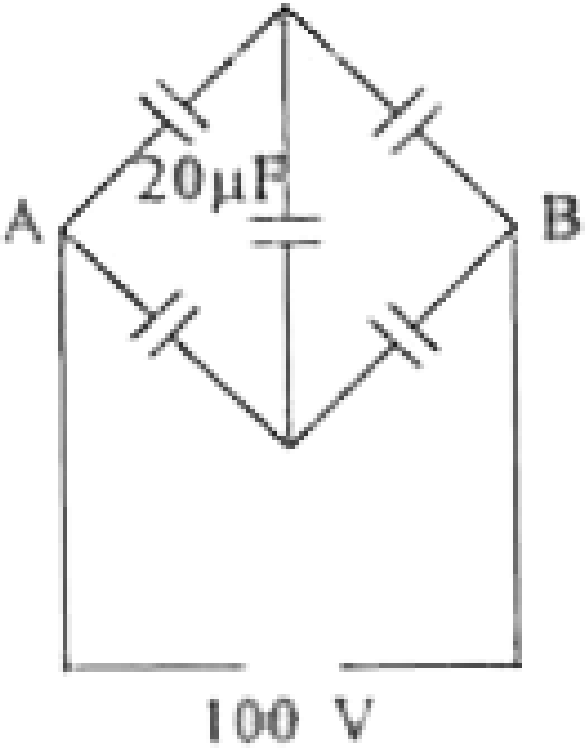
36. Five capacitors of $20\mu F$ capacity each are commected to a D.C potential of 100 volts shown in the figure The equivalent capacitance

between the point A and B will be equal to



A. $40\mu F$

B. $30\mu F$

C. $50\mu F$

D. $20\mu F$

Answer: D

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37. The insulated spheres of radii R_1 and R_2 having charges Q_1 and Q_2 respectively are connected to each other. There is

A. No change in the energy of the system

B. Always a decrease in the energy

C. An increase in energy of the system

D. A decrease in the energy of the system unless $Q_1R_2 = Q_2R_1$

Answer: D

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38. A particle of mass 2 g and charge $1\mu C$ is held at rest on a frictionless surface at a distance of 1m from a fixed charge of 1 mC. If

the particle is released it will be repelled. The speed of the particle when it is at distance of 10 m from fixed charge is :

A. 100 m/sec

B. 60 m/sec

C. 90 m/sec

D. 45 m/sec

Answer: C

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39. The intensity of a sound wave gets reduced by 20% on passing through a slab. The reduction intensity on passage through two such consecutive slabs

A. 40%

B. 30%

C. 36%

D. 50%

Answer: C

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40. When temperature is increases, the frequency of organ pipe

A. Decreases

B. Remains the same

C. Increases

D. Becomes zero

Answer: C

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41. The displacement of partcles in a string streched in the x-direction is by y. Among the following expressions for y, those describing wave motion are :

A. $\cos kx \sin \omega t$

B. $\cos(kx + \omega t)$

C. $k^2x^2 - \omega^2t^2$

D. $\cos\left(k^2x^2 - \omega^2t^2\right)$

Answer: D

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42. Two sources of sound are in resonance when

A. The look alike

B. They produce sound of same frequency

C. They are situated at a particular distance from each other

D. They are excited by the same exciting device

Answer: C

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43. A transverse wave is described by the equation $y = A\sin 2\pi\left(vt - \frac{x}{\lambda}\right)$. The maximum particle velocity is equal to four times the wave velocity if

A. $\lambda = \pi Y_0/4$

B. $\lambda = \pi Y_0$

C. $\lambda = \pi Y_0/2$

D. $\lambda = 2\pi Y_0$

Answer: C

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44. Define the frequency of an Ac.

A. 3 Km/sec

B. 4 km/sec

C. 2 km/sec

D. 0.5 km/sec

Answer: D

45. A tuning fork of frequency 480 Hz produces 10 beats per second when sounded with a vibrating sonometer string. What must have been the frequency of the string if a slight increase in tension produces lesser beats per second than before

A. 40 Hz

B. 480 Hz

C. 470 Hz

D. 490 Hz

Answer: C

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46. A tuning fork of frequency 480 Hz produces 10 beats per second when sounded with a vibrating sonometer string. What must have been the frequency of the string if a slight

increase in tension produces lesser beats per second than before

A. 460 Hz

B. 470 Hz

C. 480 H

D. 490 Hz

Answer: D

47. 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. 50

B. 200

C. 100

D. 5

Answer: C

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48. The first diffraction minima due to a single slit diffraction is at $\theta = 30^\circ$ for a light of wavelength 5000Å The width of the slit is

A. $5 \times 10^{-5} cm$

B. $2.5 \times 10^{-5} cm$

C. $1.0 \times 10^{-5} cm$

D. $1.25 \times 10^{-5} cm$

Answer: C

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49. The wavelength of the light of a laser beam can be used as a standard of

A. Time

B. Angle

C. Temperature

D. Length

Answer: D

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50. Polarisation of light proves the -

A. Corpuscular nature of light

B. Transverse wave nature of light

C. Quantum nature of light

D. Longitudinal wave nature of light

Answer: B

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51. An electron microscope is superior to an optical microscope in

A. Having better resolving power

B. Low cost

C. Being easy to handle

D. Quikness of observation

Answer: A

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52. The intensity of illumination at a distances of 5 m from a 200 candela source is

A. $10\ \text{lumens}/\text{m}^2$

B. $24\ \text{lumens}/\text{m}^2$

C. $8\ \text{lumens}/\text{m}^2$

D. $4\ \text{lumens}/\text{m}^2$

Answer: B

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53. A simple telescope consisting of an objective of focal length 60 cm and a single eye lens of focal length 5 cm is focused on a distant object in such a way that parallel rays emerge from eye lens. If the object subtends an angle of 2° at the objective, the angular width of the image is (Let $\tan\theta = \theta$ assuming θ small).

A. 10°

B. 50°

C. 24°

D. $1/60^\circ$

Answer: C

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54. Two lenses of power $+12$ and -2 dioptres are placed in contact. The combined focal length of the combination will be

A. 10 cms

B. 16.6 cms

C. 12.5 cms

D. 8.33 cms

Answer: A

55. A rayt of light passes through an equilateral prism (refrective index = 1.5) The angle of deviation (minimum) is

A. 45°

B. 20°

C. $37^\circ 12'$

D. 30°

Answer: C

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56. A body cools from $80^\circ C$ to $70^\circ C$ in 6 minutes Under the saame external conditions to cool from $60^\circ C$ to $50^\circ C$ it will take

A. Less than 6 minutes

B. 6 minutes

C. More than 6 minutes

D. Cannot be predicted

Answer: C

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57. Explain internal energy as a state function.

A. Does not depend upon path

B. Corresponds to an adiabatic process

C. Depends upon path

D. Corresponds to an isothermal process

Answer: A

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58. The work done by the string of a simple pendulum during one complete oscillation is

A. Total energy of the pendulum

B. Potential energy of the pendulum

C. Kinetic energy of the pendulum

D. Zero

Answer: D

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59. A stone released with zero velocity from the top of a water, reaches the ground in 4s. The height of the tower is $\left(g = 10m/s^2\right)$

A. 20m

B. 80m

C. 40m

D. 160m

Answer: B

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60. If c and R denote capacity and resistance the dimensions of CR are :

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

B. $\left[M^0L^2T^{-2}\right]$

C. $\left[M^1L^0T^2\right]$

D. Not expressible in terms of [MLT]

Answer: A

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