PHYSICS

BOOKS - KCET PREVIOUS YEAR PAPERS

KARNATAKA CET 2014

Physics

1. A solenoid length 0.4cm, radius 1 cm and 400 turns of wire. If a current of 5 A is passed

through this solenoid, what is the magnetic field inside the solenoid ?

A. $6.28 \times 10^{-7} T$

B. $6.28 \times 10^{-4} T$

C. $6.28 \times 10^{-6} T$

D. $6.28 \times 10^{-3} T$

Answer:

2. A gyromagnetic ratio of the electron revolving in a circular orbit of hydrogen atom is $8.8 \times 10^{10} Ckg^{-1}$. What is the mass of the electron? Given charge of the electron $= 1.6 \times 10^{-19} C$.

A. $1.1 \times 10^{-29} kg$

B. $1 \times 10^{-29} kg$

C. $\dfrac{1}{11} \times 10^{-29} kg$

D. $0.1 \times 10^{-29} kg$

Answer: C

3. What is the value of shunt resistance required to convert a galvanometer of resistance 100Ω into an ammeter of range 1 A ?

Given: Full scale deflection of the galvanometer is 5 mA.

    A. 0.5Ω

    B. $\dfrac{5}{9.95}\Omega$

    C. 0.05Ω

D. $\dfrac{9.95}{5} \Omega$

Answer: B

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4. A circular coil of radius 10 cm and 100 turns carries a current 1 A. What is the magnetic moment of the coil ?

A. $3.142 Am^2$

B. $3.142 \times 10^4 Am^2$

C. $3Am^2$

D. $10^4 Am^2$

Answer: A

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5. A susceptibility of a certain magnetic material is 400. What is the class of the magnetic material ?

A. Ferromagnetic

B. Diamagnetic

C. Ferroelectric

D. Paramagnetic

Answer: A

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6. A solenoid of inductance 2 H carries a current of 1 A. What is the magnetic energy stored in a solenoid ?

A. 4 J

B. 2 J

C. 5 J

D. 1 J

Answer: D

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7. A multimeter reads a voltage of a certain

A.C. source as 100 V. What is the peak value of

voltage of A.C. source ?

A. 141.4 V

B. 200 V

C. 400 V

D. 100 V

Answer: A

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8. A series LCR circuit contains inductance 5 mH, capacitance $2\mu F$ and resistance 10Ω. If a frequency A.C. source is varied, what is the

frequency at which maximum power is dissipated ?

A. $\dfrac{2}{\pi} \times 10^5$ Hz

B. $\dfrac{10^5}{\pi}$ Hz

C. $\dfrac{5}{\pi} \times 10^3$ Hz

D. $\dfrac{10^{-5}}{\pi}$ Hz

Answer: C

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9. A step down transformer has 50 turns on secondary and 1000 turns on primary winding. If a transformer is connected to 220 V 1 A A.C. source, what is output current of the transformer ?

A. 100 A

B. $\dfrac{1}{20}A$

C. $2A$

D. 20 A

Answer: D

10. The average power dissipated in A.C. circuit is 2 watt. If a current flowing through a circuit is 2 A and impedance is 1Ω, what is the power factor of the A.C. circuit ?

A. 0

B. 0.5

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

D. 1

11. A plane electromagnetic wave of frequency 20 MHz travels through a space along x direction. If the electric field vector at a certain point in space is 6 V m^{-1}, what is the magnetic field vector at that point ?

A. 2 T

B. $2 \times 10^{-8} T$

C. $\dfrac{1}{2}T$

D. $\dfrac{1}{2} \times 10^{-8}$ T

Answer: B

12. Two capacitors of 10 PF and 20 PF are connected to 200 V and 100 V sources respectively. If they are connected by the wire, what is the common potential of the capacitors ?

A. 300 volt

B. 133.3 volt

C. 400 volt

D. 150 volt

Answer: B

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13. A physical quantity Q is found to depend

on observables x, y and z, obeying relation

$Q = \dfrac{x^3 y^2}{z}$. The percentage error in the measurements of x, y and z are 1% , 2% and 4% respectively. What is percentage error in the quantity Q ?

A. 0.11

B. 0.04

C. 0.01

D. 0.03

Answer: A

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14. Which of the following is not a vector quantity ?

A. Momentum

B. Weight

C. Potential energy

D. Nuclear spin

Answer: C

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15. A car moves from A to B with a speed of 30 kmph and from B to A with a speed of 20 kmph. What is the average speed of the car ?

A. 50 kmph

B. 25 kmph

C. 10 kmph

D. 24 kmph

Answer: D

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16. A body starts from rest and moves with constant acceleration for t s. It travels a distance x_1 in first half of time and x_2 in next half of time, then

A. $x_2 = 3x_1$

B. $x_2 = x_1$

C. $x_2 = 4x_1$

D. $x_2 = 2x_1$

Answer: A

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17. A person is driving a vehicle at uniform speed of $5ms^{-1}$ on a level curved track of radius 5m. The coefficient of static friction between tyres and road is 0.1. Will the person slip while taking the turn with the same speed ? Take $g = 10ms^{-2}$.

Choose the correct statement.

A. A person will slip if $v^2 < 5ms^{-1}$.

B. A person will slip if $v^2 = 5ms^{-1}$.

C. A person will slip if $v^2 > 10ms^{-1}$.

D. A person will slip if $v^2 > 5ms^{-1}$.

Answer: D

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18. A stone is thrown vertically at a speed of $30ms^{-1}$ making an angle of $45°$ with the horizontal. What is the maximum height reached by the stone ? Take $g = 10ms^{-2}$.

A. 15 m

B. 30 m

C. 10 m

D. 22.5 m

Answer: D

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19. A force $\overrightarrow{F} = 5\hat{i} + 2\hat{j} - 5\hat{k}$ acts on a particle whose position vector is

$\overrightarrow{r} = \hat{i} - 2\hat{j} + \hat{k}$. What is the torque about the origin ?

A. $8\hat{i} - 10\hat{j} - 8\hat{k}$

B. $8\hat{i} + 10\hat{j} + 12\hat{k}$

C. $10\hat{i} - 10\hat{j} - \hat{k}$

D. $8\hat{i} + 10\hat{j} - 12\hat{k}$

Answer: B

20. What is a period of revolution of earth satellite ? Ignore the height of satellite above the surface of earth.

Given :

The value of gravitational acceleration $g = 10ms^{-2}$

Radius of earta $R_E = 6400km$. Take $\pi = 3.14$.

    A. 83.73 minutes

    B. 85 minutes

    C. 90 minutes

D. 156 minutes

Answer: A

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21. A period of geostationary satellite is

A. 30 h

B. 24 h

C. 48 h

D. 12 h

Answer: B

22. What is the source temperature of the Carnot engine required to get 70% efficiency? Given sink temperature $= 27°C$

A. $270°C$

B. $1000°C$

C. $727°C$

D. $90°C$

Answer: C

23. A 10 kg metal block is attached to a spring of spring constant 1000 N m^{-1}. A block is displaced from equilibrium position by 10 cm and released. The maximum acceleration of the block is

A. $200ms^{-2}$

B. $10ms^{-2}$

C. $0.1ms^{-2}$

D. $100ms^{-2}$

Answer: B

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24. A metallic wire of 1 m length has a mass of 10×10^{-3}kg. If a tension of 100 N is applied to a wire, what is the speed of transverse wave ?

A. $200ms^{-1}$

B. $100ms^{-1}$

C. $0.1ms^{-1}$

D. $10ms^{-1}$

Answer: B

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25. A train is approaching towards a platform with a speed of 10 m s^{-1} while blowing a whistle of frequency 340 Hz. What is the

frequency of whistle heard by a stationary observer on the platform ? Given speed of sound $= 340ms^{-1}$.

A. 340 Hz

B. 330 Hz

C. 360 Hz

D. 350 Hz

Answer: D

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26. A rotating wheel changes angular speed from 1800 rpm to 3000 rpm in 20 s. What is the angular acceleration assuming to be uniform ?

A. $2\pi \ \text{rad} \ s^{-2}$

B. $60\pi \text{rad} s^{-2}$

C. $40\pi \text{rad} s^{-2}$

D. $90\pi \text{rad} \ s^{-2}$

Answer: A

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27. A flow of liquid is streamline if the Reynold number is

A. between 2000 to 3000

B. less than 1000

C. between 4000 to 5000

D. greater than 1000

Answer: B

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28. A pipe of 30 cm long and open at both the ends produces harmonics. Which harmonic mode of pipe resonates a 1.1 kHz source ? Given speed of sound in air $= 330ms^{-1}$.

A. Third harmonic

B. Fifth harmonic

C. Second harmonic

D. Fourth harmonic

Answer: C

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29. Explain anomalous expansion of water

A. $> 4°C$

B. $4°C$

C. $10°C$

D. $< 4°C$

Answer: B

30. An aeroplane executes a horizontal loop at a speed of 720 kmph with its wings banked at $45°$. What is the radius of the loop ?

Take $g = 10ms^{-1}$.

    A. 7.2 km

    B. 4 km

    C. 2 km

    D. 4.5 km

Answer: B

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31. A body having a moment of inertia about its axis of rotation equal to 3 kg m^{-2} is rotating with angular velocity of 3 rad s^{-1}. Kinetic energy of this rotating body is same as that of a body of mass 27 kg moving with velocity v. The value of v is

A. $2ms^{-1}$

B. $1ms^{-1}$

C. $1.5ms^{-1}$

D. $0.5 ms^{-1}$

Answer: B

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32. A cycle tyre bursts suddenly. What is the type of this process ?

    A. Isochoric

    B. Isothermal

    C. Isobaric

D. Adiabatic

Answer: D

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33. An object is placed at 20 cm in front of a concave mirror produces three times magnified real image. What is focal length of the concave mirror ?

A. 10 cm

B. 15 cm

C. 7.5 cm

D. 6.6 cm

Answer: B

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34. A focal length of a lens is 10 cm. What is power of a lens in dioptre?

A. 15 D

B. 0.1 D

C. 20 D

D. 10 D

Answer: D

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35. A microscope is having objective of focal length 1 cm and eyepiece of focal length 6 cm. If tube length is 30 cm and image is formed at the least distance of distinct vision, what is

the magnification produced by the microscope

? Take $D = 25$ cm.

A. 25

B. 6

C. 125

D. 150

Answer: D

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36. A fringe width of a certain interference pattern is $\beta = 0.002$ cm. What is the distance of 5th dark fringe from centre ?

    A. 1.1×10^{-2}cm

    B. 1×10^{-2} cm

    C. 3.28×10^{6} cm

    D. 11×10^{-2} cm

Answer:

37. Diameter of the objective of a telescope is 200 cm. What is the resolving power of a telescope ? Take wavelength of light $= 5000\text{Å}$

.

A. 1×10^6

B. 6.56×10^6

C. 3.28×10^6

D. 3.28×10^5

Answer: C

38. A polarized light of intensity I_0 is passed through another polarizer whose pass axis makes an angle of $60°$ with the pass axis of the former. What is the intensity of polarized light from second polarizer ?

A. $I = I_0/5$

B. $I = I_0$

C. $I_0/4$

D. $I = I_0/6$

Answer: C

39. What is the de Broglie wavelength of the electron accelerated through a potential difference of 100 volt ?

A. 0.1227 Å

B. 12.27 Å

C. 0.001227 Å

D. 1.227 Å

Answer: D

40. The maximum kinetic energy of emitted photoelectrons depends on

    A. incident angle

    B. potential

    C. pressure

    D. frequency

Answer: D

41. Give an account of the spectral series of an

hydrogen atom.

    A. Lyman series

    B. Paschen series

    C. Balmer series

    D. Pfund series

Answer: C

42. What is the energy of the electron revolving in third orbit expressed in eV?

A. 4.53 eV

B. 1.51 eV

C. 4 eV

D. 3.4 eV

Answer: B

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43. The relation between half life (T) and decay constant (λ) is

    A. $\lambda T = \log_e 2$

    B. $\lambda T = 1$

    C. $\lambda = \log 2T$

    D. $\lambda T = \dfrac{1}{2}$

Answer: A

44. A force between two protons is same as the force between proton and neutron. The nature of the force is

A. electrical force

B. weak nuclear force

C. gravitational force

D. strong nuclear force

Answer: D

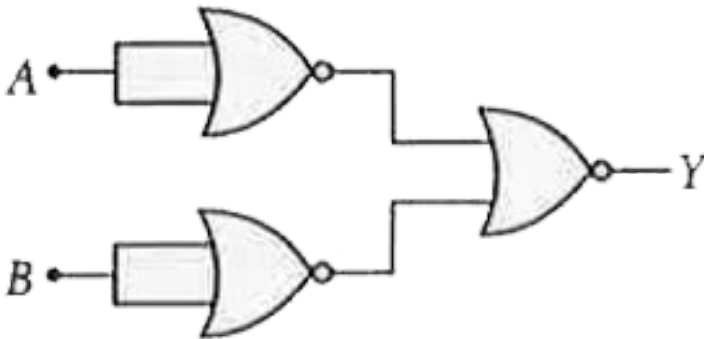**45.** In n type semiconductor, electrons are majority charge . The reason is

    A. mobility of electrons is extremely small

    B. electrons are stationary

    C. atom is electrically neutral

    D. electrons neutralize with holes

Answer: C

46. For the given digital circuit, write the truth table and identify the logic gate it represents

A. NAND gate

B. OR gate

C. AND gate

D. NOR gate

Answer: C

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47. If α-current gain of a transistor is 0.98 . What is the value of β-current gain of the transistor ?

A. 4.9

B. 0.49

C. 5

D. 49

Answer: D

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48. A tuned amplifier circuit is used to generate a carrier frequency of 2MHz for the amplitude modulation. The value of $\sqrt{LC}$ is

A. $\dfrac{1}{3\pi \times 10^6}$

B. $\dfrac{1}{2\pi \times 10^6}$

C. $\dfrac{1}{4\pi \times 10^6}$

D. $\dfrac{1}{2\pi \times 10^6}$

Answer: C

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49. If a charge on the body is 1 nC, then how many electrons are present on the body ?

A. 6.25×10^{27}

B. 1.6×10^{19}

C. 6.25×10^{28}

D. 6.25×10^{9}

Answer: D

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50. Two equal and opposite charges of masses m_1 and m_2 are accelerated in an uniform electric field through the same distance. What

is the ratio of their accelerations if their ratio of mass is $\dfrac{m_1}{m_2} = 0.5$?

A. $\dfrac{a_1}{a_2} = 2$

B. $\dfrac{a_1}{a_2} = 0.5$

C. $\dfrac{a_1}{a_2} = 3$

D. $\dfrac{a_1}{a_2} = 1$

Answer: A

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51. What is the nature of Gaussian surface involved in Gauss law of electrostatic ?

A. Magnetic

B. Scalar

C. Vector

D. Electrical

Answer: C

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52. What is the electric potential at a distance of 9 cm from 3 nC ?

    A. 300 V

    B. 270 V

    C. 30 V

    D. 3 V

Answer: A

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53. A voltmeter reads 4 V when connected to a parallel plate capacitor with air as a dielectric. When a dielectric slab is introduced between plates for the same configuration , voltmeter reads 2V. What is the dielectric constant of the material ?

    A. 8

    B. 0.5

    C. 10

    D. 2

Answer: D

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54. A spherical conductor of radius 2 cm is uniformly charged with 3 nC. What is the electric field at a distance of 3 cm from the centre of the sphare ?

A. $3 \times 10^4 Vm^{-1}$

B. $3 \times 10^6 Vm^{-1}$

C. $3 \times 10^{-4} Vm^{-1}$

D. $3Vm^{-1}$

Answer: A

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55. A carbon film resistor has colour code Green Black Violet Gold. The value of the resistor is

A. $500 \pm 5 \% \ M\Omega$

B. $50 M\Omega$

C. $500 \pm 10 \% \ M\Omega$

D. $500 M\Omega$

Answer: A

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56. Two resistors of resistances 2Ω and 6Ω are connected in parallel. This combination is then connected to a battery of emf 2 V and internal resistance 0.5Ω . What is the current flowing through the battery ?

A. $\dfrac{4}{17}A$

B. $4A$

C. $1A$

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

Answer: C

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57. The equivalent resistance of two resistors connected in series is 6Ω and their parallel

equivalent resistance is $\dfrac{4}{3}\Omega$. What are the values of resistances ?

A. $4\Omega, 2\Omega$

B. $4\Omega, 6\Omega$

C. $6\Omega, 2\Omega$

D. $8\Omega, 1\Omega$

Answer: A

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58. In a potentiometer experiment of a cell of emf 1.25 V gives balancing length of 30 cm. If the cell is replaced by another cell, balancing length is found to be 40 cm. What is the emf of second cell ?

    A. $\cong 1.47$ V

    B. $\cong 1.57$ V

    C. $\cong 1.37$ V

    D. $\cong 1.67$ V

Answer: D

59. A charged particle experiences magnetic force in the presence of magnetic field. Which of the following statement is correct ?

A. The particle is stationary and magnetic field is perpendicular.

B. The particle is moving and magnetic field is perpendicular to the velocity.

C. The particle is stationary and magnetic field is parallel.

D. The particle is moving and magnetic field is parallel to velocity.

Answer: B

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60. What is the cause for the helical motion of a charged particle in a magnetic field?

A. Linear

B. Circular

C. Helical

D. Elliptical

Answer: C

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