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Previous Year Paper

Physics - 2014



Multiple Choice Questions

1. A person is driving a vehicle at uniform speed of 5 ms^{-1} on a level curved track of radius 5 m. 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 $g = 10 \text{ ms}^{-2}$.
- A. A person will slip, if $v^2 = 5 \text{ m}^2\text{s}^{-2}$
- B. A person will slip, if $v^2 > 5 \text{ m}^2\text{s}^{-2}$
- C. A person will slip, if $v^2 < 5 \text{ m}^2\text{s}^{-2}$
- D. A person will not slip, if $v^2 > 5 \text{ m}^2\text{s}^{-2}$

Answer

2. A stone is thrown vertically at a speed of 30 ms^{-1} taking an angle of 45° with the horizontal. What is the maximum height reached by the stone ? Take $g = 10 \text{ ms}^{-2}$.
- A. 30 m
- B. 22.5 m
- C. 15 m
- D. 10 m

Answer

3. A force $F = 5\hat{i} + 2\hat{j} - 5\hat{k}$ acts on a particle whose position vector is $r = \hat{i} - 2\hat{j} + \hat{k}$. What is the torque about the origin ?
- A. $8\hat{i} + 10\hat{j} + 12\hat{k}$
- B. $8\hat{i} + 10\hat{j} - 12\hat{k}$
- C. $8\hat{i} - 10\hat{j} - 8\hat{k}$
- D. $10\hat{i} - 10\hat{j} - \hat{k}$

Answer

4. What is a period of revolution of the earth satellite ? Ignore the height of satellite above the surface of the earth. Given :
1. The value of gravitational acceleration $g = 10 \text{ ms}^{-2}$
2. Radius of the earth, $R_E = 6400 \text{ km}$ (Take $\pi = 3.14$)
- A. 85 min
- B. 156 min
- C. 83.73 min

D. 90 min

5. A period of geostationary satellite is
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A. 24 h
B. 12 h
C. 30 h
D. 48 h

Answer

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

A. $60 \pi \text{ rad s}^{-2}$
B. $90 \pi \text{ rad s}^{-2}$
C. $2\pi \text{ rad s}^{-2}$
D. $40 \pi \text{ rad s}^{-2}$

Answer

7. An aeroplane executes a horizontal loop at a speed of 720 km/h with its wings banked at 45° .

What is the radius of the loop ? Take $g = 10 \text{ ms}^{-2}$

A. 4 km
B. 4.5 km
C. 7.2 km
D. 2 km

Answer

8. 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 a velocity v . The value of v is

A. 1 ms^{-1}
B. 0.5 ms^{-1}
C. 2 ms^{-1}
D. 1.5 ms^{-1}

Answer

9. A physical quantity Q is found to depend on observables x , y and z obeying relation $Q = x^3y^2z$. 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. 4 %
B. 3 %
C. 11 %
D. 1 %

Answer

10. Which of the following is not a vector quantity ? - Your Favourite Questions. Join www.zigya.com

B. Nuclear spin

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C. Momentum

D. Potential energy

Answer

11. A car moves from A to B with a speed of 30 km/h and from B to A with a speed of 20 km/h. What is the average speed of the car ?
- A. 25 km/h
 - B. 24 km/h
 - C. 50 km/h
 - D. 10 km/h

Answer

12. A body starts from rest and moves with constant acceleration for t sec. It travels a distance x_1 in first half of time and x_2 in next half of time, then
- A. $x_2 = x_1$
 - B. $x_2 = 2x_1$
 - C. $x_2 = 3x_1$
 - D. $x_2 = 4x_1$

Answer

13. What is the source temperature of the Carnot engine required to get 70% efficiency ? Given, sink temperature = 27°C .
- A. 1000°C
 - B. 90°C
 - C. 270°C
 - D. 727°C

Answer

14. A 10 kg metal block is attached to a spring of spring constant 1000 Nm^{-1} . A block is displaced from equilibrium position by 10 cm and released. The maximum acceleration of the block is
- A. 10 ms^{-2}
 - B. 100 ms^{-2}
 - C. 200 ms^{-2}
 - D. 0.1 ms^{-2}

Answer

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

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Answer

16. A train is approaching towards a platform with a speed of 10 ms^{-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 = 340 ms^{-1} .
- 330 Hz
 - 350 Hz
 - 340 Hz
 - 360 Hz

Answer

17. A flow of liquid is streamline, if the Reynold's number is
- less than 1000
 - greater than 1000
 - between 2000 to 3000
 - between 4000 to 5000

Answer

18. 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 = 330 ms^{-1} .
- Fifth harmonic
 - Fourth harmonic
 - Third harmonic
 - Second harmonic

Answer

19. In anomalous expansion of water, at what temperature, the density of water is maximum ?
- 4°C
 - $< 4^\circ\text{C}$
 - $> 4^\circ\text{C}$
 - 10°C

Answer

20. A cycle tyre bursts suddenly. What is the type of this process ?
- Isothermal
 - Adiabatic
 - Isochoric
 - Isobaric

Answer

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

A. 1.6×10^{19}

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D. 6.25×10^{26}

Answer

22. 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 masses is $m_1/m_2 = 0.5$?

- A. $a_1/a_2 = 0.5$
- B. $a_1/a_2 = 1$
- C. $a_1/a_2 = 2$
- D. $a_1/a_2 = 3$

Answer

23. What is the nature of Gaussian surface involved in Gauss's law of electrostatic ?

- A. Scalar
- B. Electrical
- C. Magnetic
- D. Vector

Answer

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

- A. 270 V
- B. 3 V
- C. 300 V
- D. 30 V

Answer

25. 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 2 V. What is the dielectric constant of the material ?

- A. 0.5
- B. 2
- C. 8
- D. 10

Answer

26. 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 sphere ?

- A. $3 \times 10^6 \text{ Vm}^{-1}$
- B. 3 Vm^{-1}
- C. $3 \times 10^4 \text{ Vm}^{-1}$

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

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- A. $50 \text{ M}\Omega$
- B. $500 \text{ M}\Omega$
- C. $500 \pm 5\% \text{ M}\Omega$
- D. $500 \pm 10\% \text{ M}\Omega$

Answer

28. 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. 4 A
- B. 43 A
- C. 417 A
- D. 1 A

Answer

29. The equivalent resistance of two resistors connected in series is 6Ω and their parallel equivalent resistance is 43Ω . What are the values of resistances ?

- A. $4 \Omega, 6 \Omega$
- B. $8 \Omega, 1 \Omega$
- C. $4 \Omega, 2 \Omega$
- D. $6 \Omega, 2 \Omega$

Answer

30. 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 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. $\approx 1.57 \text{ V}$
- B. $\approx 1.67 \text{ V}$
- C. $\approx 1.47 \text{ V}$
- D. $\approx 1.37 \text{ V}$

Answer

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

- A. The particle is moving and magnetic field is perpendicular to the velocity
- B. The particle is moving and magnetic field is parallel to the velocity
- C. The particle is stationary and magnetic field is perpendicular
- D. The particle is stationary and magnetic field is parallel

Answer

32. If a velocity has both perpendicular and parallel components while moving through a magnetic field, what is the path followed by a charged particle ?

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C. Linear

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D. Helical

Answer

33. A solenoid has length 0.4 cm, 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. 6.28×10^{-4} T

B. 6.28×10^{-3} T

C. 6.28×10^{-7} T

D. 6.28×10^{-6} T

Answer

34. A gyromagnetic ratio of the electron revolving in a circular orbit of hydrogen atom is 8.8×10^{10} C kg⁻¹. What is the mass of the electron ? Given, charge of the electron = 1.6×10^{-19} C.

A. 1×10^{-29} kg

B. 0.1×10^{-29} kg

C. 1.1×10^{-29} kg

D. $1/11 \times 10^{-29}$ kg

Answer

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

Given, full scale deflection of the galvanometer is 5 mA.

A. 59.95 Ω

B. 9.955 Ω

C. 0.5 Ω

D. 0.05 Ω

Answer

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

A. 3.142×10^4 Am²

B. 10^4 Am²

C. 3.142 Am²

D. 3 Am²

Answer

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

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Answer

38. A solenoid of inductance 2 H carries a current 1 A. What is the magnetic energy stored in a solenoid ?
- A. 2 J
 - B. 1 J
 - C. 4 J
 - D. 5 J

Answer

39. A multimeter reads a voltage of a certain AC source as 100 V. What is the peak value of voltage of AC source ?
- A. 200 V
 - B. 100 V
 - C. 141 V
 - D. 400 V

Answer

40. A series LCR circuit contains inductance 5 mH, capacitance 2 μ F and resistance 10 Ω . If a frequency AC source is varied, what is the frequency at which maximum power is dissipated ?
- A. 105π Hz
 - B. 10π Hz
 - C. $2\pi \times 105$ Hz
 - D. $5\pi \times 103$ Hz

Answer

41. 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 AC source, what is output current of the transformer ?
- A. 120 A
 - B. 20 A
 - C. 100 A
 - D. 2 A

Answer

42. The average power dissipated in AC circuit is 2 W. If a current flowing through a circuit is 2 A impedance is 1 Ω , what is the power factor of the AC circuit ?
- A. 0.5
 - B. 1
 - C. Zero
 - D. 12

Answer

43. 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 Vm^{-1} , what is the magnetic field vector at that point ?

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A. $2 \times 10^{-3} \text{ T}$

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

C. 2 T

D. 12 T

Answer

44. 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. 133.3 V

B. 150 V

C. 300 V

D. 400 V

Answer

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

A. 15 cm

B. 6.6 cm

C. 10 cm

D. 7.5 cm

Answer

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

A. 0.1 D

B. 10 D

C. 15 D

D. 1 D

Answer

47. 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 $D = 25 \text{ cm}$.

A. 6

B. 150

C. 25

D. 125

Answer

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

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

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D. 3.28×10^6 cm

Answer

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

- A. 6.56×10^6
- B. 3.28×10^5
- C. 1×10^6
- D. 3.28×10^6

Answer

50. 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 emergent polarized light from second polarizer ?

- A. $I = I_0$
- B. $I = I_0/6$
- C. $I = I_0/5$
- D. $I_0/4$

Answer

51. What is the de-Broglie wavelength of the electron accelerated through a potential difference of 100 V ?

- A. $12.27 \text{ \AA}$
- B. $1.227 \text{ \AA}$
- C. $0.1227 \text{ \AA}$
- D. $0.001227 \text{ \AA}$

Answer

52. The maximum kinetic energy of the photoelectrons depends only on

- A. potential
- B. frequency
- C. incident angle
- D. pressure

Answer

53. Which of the following spectral series of hydrogen atom is lying in visible range of electromagnetic wave ?

- A. Paschen series
- B. Pfund series

C. Lyman series

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Answer

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

- A. 1.51 eV
- B. 3.4 eV
- C. 4.53 eV
- D. 4 eV

Answer

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

- A. $\lambda T = 1$
- B. $\lambda T = 12$
- C. $\lambda T = \log_e 2$
- D. $\lambda = \log 2T$

Answer

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

- A. weak nuclear force
- B. strong nuclear force
- C. electrical force
- D. gravitational force

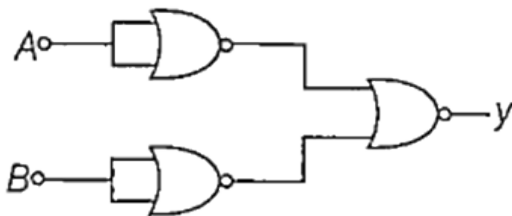
Answer

57. In n-type semiconductor, electrons are majority charge carriers but it does not show any negative charge. The reason is

- A. electrons are stationary
- B. electrons neutralize with holes
- C. mobility of electrons is extremely small
- D. atom is electrically neutral

Answer

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



- A. OR gate
- B. NOR gate
- C. NAND gate
- D. AND gate

Answer

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

A. 0.49

B. 49, Study, Assignments, Solved Previous Year Papers . Questions and Answers. Free Forever.

C. 4.9

D. 5

Answer

60. A tuned amplifier circuit is used to generate a carrier frequency of 2 MHz for the amplitude modulation. The value of LC is

A. $12\pi \times 10^6$

B. 12×10^6

C. $13\pi \times 10^6$

D. $14\pi \times 10^6$

Answer