PHYSICS

BOOKS - KUMAR PRAKASHAN KENDRA PHYSICS (GUJRATI ENGLISH)

BOARD'S QUESTION PAPER MARCH-2020

PART-A

1. According to Ohm's law $\left(R = \frac{V}{I}\right)$ as current flowing through a conductor increases, resistance of conductor

A. decreases

B. increases

C. remains constant

D. nothing can be said

Answer: B

Watch Video Solution

2. Kichhoff's junction role represents.....

A. conservation of linear momentum

B. conservation of energy

C. conservation of angular momentum

D. conservation of charge

Answer: D

 Watch Video Solution

3. Two resistors when connected in series net resistance is 5Ω and when they are connected in parallel net resistance is 1.2Ω What are these resistors?

A. $2\Omega, 3\Omega$

B. $1\Omega, 4\Omega$

C. $0.6\Omega, 0.6\Omega$

D. $1\Omega, 0.2\Omega$

Answer: C

Watch Video Solution

Watch video solution

4. A straight wire of mass 200g and length 1.5m carries a current of 2A. To suspend it in a air by a uniform horizontal magnetic field, value of required magnetic field is.... T

A. 6.5

B. 0.45

C. 0.65

D. 4.5

Answer: B

Watch Video Solution

5. Unit of Bolar magneton is.....

A. Am

B. Cm^2

C. Am^{-2}

D. Am^2

Answer: D

Watch Video Solution

6. Current sensivity of galvanometer in inversely proportional to.....

A. number of turns

B. torsional constant

C. area

D. magnetic field

Answer: A

Watch Video Solution

7. Frequency of cyclotron is independent of .....

A. radius of its trajectory

B. charge of a particle

C. applied magnetic field

D. mass of a particle

Answer: C

Watch Video Solution

8. A circular coil of a wire containing 100 turns each of radius 2cm carries a current of 0.20A. The magnetic field at the centre of the coil is.....

A. $2\pi \times 10^{-4}$

B. $\pi \times 10^{-4}$

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

D. 10^{-4}

Answer: C

Watch Video Solution

9. Which one of the following represent Curie's law?

A. $M = \frac{C_X}{T}$

B. $M = \frac{CB_0}{T}$

C. $M = \frac{C_X}{T - T_e}$

D. $M = \frac{CT}{B_0}$

Answer: A

Watch Video Solution

10. At the place, on the surface of the earth, ratio of horizontal and vertical component of the magnetic field is $\sqrt{3}$ then angle of dip at this place is.....rad

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

B. $\frac{\pi}{6}$

C. $\frac{\pi}{4}$

D. zero

Answer: A

Watch Video Solution

11. Meissner effect is observed in..... substances.

A. ferromagnetic

B. paramagnetic

C. superconducting

D. permanent magnetic

Answer: B

Watch Video Solution

12. Dimensional formula of mutual inductance is .....

A. $M^1L^2T^{-2}A^{-2}$

B. $M^1L^2T^{-2}A^{-1}$

C. $M^1L^{-2}T^2A^2$

D. $M^{-1}L^{-2}T^2A^{-1}$

Answer: C

Watch Video Solution

13. The magnitude of the induced emf is equal to the time rate of change of..

A. magnetic force

B. electric flux

C. magnetic flux

D. electric force

Answer: B

Watch Video Solution

14. Which one of the following is an equation of magnetic energy density?

A. $\frac{1}{2}\mu_0 B^2$

B. $\frac{B^2}{2\mu_0}$

C. $\frac{2B^2}{\mu_0}$

D. $\frac{B^2}{\mu_0}$

Answer: A

Watch Video Solution

15. A $15\mu F$ capacitor is connected to a 220V, 50Hz a.c source Value of capacitance reactance is .....Ω

A. 106

B. 424

C. 212

D. 21.2

Answer: B

Watch Video Solution

16. Electric quantity .....is equivalent to mechanical quantity, force constant (k)

A. charge (Q)

B. inductance (L)

C. reciprocal of inductance $\left(\frac{1}{L}\right)$

D. reciprocal of capacitance $\left(\frac{1}{C}\right)$

Answer: D

Watch Video Solution

17. In L-C capacitor oscillator at..... Time energy in capacitor and energy in inductor are equal.

A. $\frac{T}{8}$

B. $\frac{T}{4}$

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

D. T

Answer: C

Watch Video Solution

18. A power transmission line feeds input power at 3300V to a step down transformer with its primary windings having 2000 turns. What should be the number of turns in the secondary in order to get output power at 330V.

A. 400

B. 200

C. 33

D. 40

Answer: A

Watch Video Solution

19. Dimension of $\frac{1}{\mu e}$ is same as dimension of.....

A. square of velocity

B. velocity

C. accleration

D. momentum

Answer: C

Watch Video Solution

20. Frequency of FM radio band is from.....

A. 88MHz to 108Mhz

B. 88kHz to 108kHz

C. 54 mHz to 890 mHz

D. 54 Hz to 890 kHz

Answer: C

Watch Video Solution

21. To destroy cancer cells..... Are used.

A. X rays

B. Gamma rays

C. Ultraviolet rays

D. Infrared rays

Answer: A

Watch Video Solution

22. In optical fiber the refractive index of the material of the core is..... That of the cladding.

A. higher than

B. less than

C. equal to

D. half

Answer: C

Watch Video Solution

23. A magician during a show makes a glass lens with n=1.47 disappear in the trough of liquid. What is the refractive index of the liquid.

A. zero

B. ∞

C. equal to refractive index of water

D. 1.47

Answer: D

Watch Video Solution

24. If a size of particle is a and wavelength of light is λ for $a << \lambda$ scattering is directly proportional to....

A. $\frac{1}{\lambda^4}$

B. λ^4

C. λ^2

D. $\frac{1}{\lambda^2}$

Answer: C

Watch Video Solution

25. In a Young double slit experiment, the width of the source slit is increased then.....

A. instead of interference diffraction appears.

B. fringe pattern gets more and more sharp.

C. angular distance between fringes increased.

D. fringe pattern gets less and less sharp.

Answer: D

Watch Video Solution

26. V_{radial} is considered.....when the source moves away from the observer.

A. negative

B. positive

C. zero

D. infinite

Answer: A

 Watch Video Solution

27. Light of wavelength $6000A$ is coming from a star. What is the limit of resolution of a telescope whose objective has a diameter of 100 inch?

A. $2.9 \times 10^{-7} radian$

B. 10^{-7} radian

C. $2.9 \times 10^{-5} radian$

D. $9.2 \times 10^{-7} radian$

Answer: C

Watch Video Solution

28. Unpolarised light is incident on a plane glass surface. What would be the angle of incidence so that the reflected and refracted rays are perpendicular to each other.

A. 33°

B. 37°

C. 53°

D. 57°

Answer: D

Watch Video Solution

29. Work function of .....is the lowest.

A. caesium

B. platinum

C. nickel

D. copper

Answer: C

Watch Video Solution

30. By applying electric field of the order of.....Vm^{-1} to a metal, electrons can be pulled out of the metal.

A. 10^5

B. 10^6

C. 10^8

D. 10^2

Answer: B

Watch Video Solution

31. Value of stopping potential depends on.....

Of incident light.

A. frequency

B. intensity

C. momentum

D. velocity

Answer: C

Watch Video Solution

32. Monochromatic light of frequency $6 \times 10^{14} Hz$ is produced by laser. Each photon has an energy=.....

A. 4×10^{-19}

B. 6×10^{14}

C. 4×10^{-20}

D. 6×10^{-14}

Answer: C

Watch Video Solution

33. is found experimentally that 13.6 eV energy is required to separate a hydrogen atom into a proton and an electron. Compute the orbital

radius and the velocity of the electron in a hydrogen atom.

A. $10.6 \times 10^{-11} m$

B. $5.3 \times 10^{-11} m$

C. $2.65 \times 10^{-11} m$

D. $1.33 \times 10^{-11} m$

Answer: A

Watch Video Solution

34. To excite the hydrogen atom from its ground state to second excited state.... eV energy is required.

A. 3.4

B. 12.09

C. 10.2

D. 13.6

Answer: A

Watch Video Solution

35. What is the shortest wavelength present in the Paschen series of spectral lines?

A. 6563A

B. 820nm

C. 911nm

D. 656nm

Answer: A

Watch Video Solution

36. In case of head on collision, when the impact parameter is minimum θ=..... Rad

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

B. 0

C. $\frac{\pi}{4}$

D. π

Answer: D

Watch Video Solution

37. Chlorine has two isotopes having masses 34.98u and 36.98u. The relative abundances of these isotopes are 75.4 and 24.6 percent. Then average mass of chlorine atom is....u

A. 34.91

B. 35

C. 35.47

D. 34.01

Answer: B

Watch Video Solution

Watch Video Solution

38. The binding energy per nucleon is almost constant for the nuclei having atomic mass number.....

A. $30 < A < 170$

B. $30 < A < 240$

C. $170 < A < 230$

D. $156 < A < 192$

Answer: C

Watch Video Solution

39. Tritium has half life of 12.5 years undergoing beta decay. What fraction of sample of tritium will remain undecayed after 50 years?

A. $\frac{1}{8}$

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

C. $\frac{1}{16}$

D. $\frac{1}{4}$

Answer: B

Watch Video Solution

40. In an n type silicon, which of the following statements is true:

A. Electrons are minority carries and pentavalent atoms are the dopants.

B. Electrons are majority carries and trivalent atoms are the dopants.

C. Holes are minority carries and pentavalent atoms are the dopants.

D. Holes are minority carries and trivalent atoms are the dopants.

Answer: B

Watch Video Solution

41. When a forward bias is applied to a p-n junction, it.....

A. raises the potential barrier

B. reduces the majority carrier current to zero

C. lowers the potential barrier.

D. none of the above

Answer: C

Watch Video Solution

42. In half wave rectification, what is the output frequency if the input frequency is 50 Hz.

A. 100Hz

B. 0

C. 50Hz

D. 25Hz

Answer: B

Watch Video Solution

43. .....as a impurity, when added in Si or Ge P-type semiconductor is obtained.

A. Arsenic

B. Antimony

C. Phosphorus

D. Boron

Answer: D

Watch Video Solution

44. The charge equivalent to 6×10^{18} electrons is

A. 1C

B. $-1C$

C. 1mC

D. $-1mC$

Answer: A

Watch Video Solution

45. The ratio of electric force and gravitational force between a proton and an electron at a certain distance is.....

A. 10^{41}

B. 2.4×10^{41}

C. 2.4×10^{39}

D. 3.9×10^{24}

Answer: B

Watch Video Solution

46. Unit of surface charge density (σ) is.....

A. $\frac{C}{m^2}$

B. $\frac{C}{m^3}$

C. $\frac{C}{m}$

D. Cm

Answer: C

Watch Video Solution

47. Electric field due to dipole at large distance (r) falls off as.....

A. $\frac{1}{r^2}$

B. $\frac{1}{r}$

C. $\frac{1}{r^3}$

D. $\frac{1}{r^4}$

Answer: B

Watch Video Solution

48. Value of dielectric strength of air is.....

Vm^{-1}

A. 3×10^4

B. 3×10^6

C. 6×10^3

D. 4×10^3

Answer: A

Watch Video Solution

49. Three capacitors of 2pF,3pF and 4pF are connected in parallel . What is the total capacitance of a network?

A. $9pF$

B. $\frac{12}{13}pF$

C. $\frac{13}{12}pF$

D. $\frac{1}{9}pF$

Answer: C

Watch Video Solution

50. Equipotential surface through a point is..... to the electric field at that point.

A. parallel

B. normal

C. at an angle of 45°

D. at an angle of 30°

Answer: A

Watch Video Solution

PART-B SECTION -A

1. Derive expression for the capacitance of the parallel plate capacitor,

Watch Video Solution

2. Write a note on Mobility.

Watch Video Solution

3. The resistance of the platinum wire of a platinum resistance thermometer at the ice point is 5Ω and at steam point is 5.23Ω. When it is inserted in a hot bath, the resistance of the wire is 5.795Ω. Calculate the temperature of the bath.

Watch Video Solution

4. Derive an expression for magnetic potential energy .for a magnetic dipole kept in a

uniform magnetic field.

Watch Video Solution

5. What is called self inductance? Derive an expression for Self induced emf.

Watch Video Solution

6. A plane electromagnetic wave of frequency 25 MHz travels in free space along the x-

direction. At a particular point in space and time, $E = 6.3\hat{j}$ V/m. What is B at this point?

Watch Video Solution

7. Derive i+e=A+δ for a triangular glass prism.

Watch Video Solution

8. Summarise the photon picture of electromagnetic radiation .

Watch Video Solution

9. What is the de-Broglie wavelength associated with an electron, accelerated through a potential difference of 100 volts.

Watch Video Solution

10. Explain Alpha Decay.

Watch Video Solution

PART-B SECTION -B

1. An electron falls through a distance of 1.5cm in a uniform electric field of magnitude $2 \times 10^4 NC^{-1}$. The direction of the field is reversed keeping its magnitude unchanged and a proton falls through the same distance. Compute the time of fall in each case.

Watch Video Solution

2. A 600pF capacitor is charged by a 200V supply. It is then disconnected from the supply and is connected to another unchanged 600pF capacitor. How much electrostatic energy is lost in the process.

 Watch Video Solution

3. For a circular coil of radius R and N turns carrying current. Prove that the magnitude of the magnetic field at a point on its axis at a

distance X from its centre is given by

$$B = \frac{\mu_0 I R^2 N}{2(x^2 + R^2)^{3/2}}$$

Watch Video Solution

4. A horizontal power line carries a current of 90A in east to west direction. What is the magnitude and direction of the magnetic field due to the current 1.5m below the line?

Watch Video Solution

5. Draw schematic diagram of Young experiment and drive $B = \frac{\lambda D}{d}$ for the distance between two consecutive bright interference fringes.

Watch Video Solution

6. In accordance with the Bohr's model find the quantum number than characterises the Earth revolution around the sun in an orbit of radius $1.5 \times 10^{11} m$ with orbital speed $3 \times 10^4 m s^{-1}$

Watch Video Solution

7. Explain the use of Zener diode as a voltage regulator.

Watch Video Solution

8. Draw the logic symbol and give the truth table of NAND gate. Why this gate is called universal gate?

Watch Video Solution

PART-B SECTION -C

1. Derive an expression for current I passing through an AC circuit containing only inductor L. Draw a Phasor diagram and graph of v and I versus ωt. Explain instantaneous power and the average power.

Watch Video Solution

2. Derive lensmaker's formula for thin lens.

Watch Video Solution

3. The distance between the two slits in Young experiment is 0.1mm. The perpendicular distance between the slits and the screen is 1.5 m. The wavelength of the incident light is 6000A. Calculate the distance between third brighta and fifth dark fringes dark fringes obtain on the screen.

Watch Video Solution

4. Explain Polarisation by scattering.

Watch Video Solution