PHYSICS

BOOKS - JEEVITH PUBLICATIONS

PHYSICS (KANNADA ENGLISH)

SUPPLEMENTARY EXAMINATION

QUESTION PAPER (WITH ANSWER)

JULY-2018

Part A

1. State and explain ohm's law

2. Define current sensitivity of a moving coil galvanometer.

3. Write the expression for force experienced by a straight conductor of length L carrying a

steady current I, moving in a uniform external magnetic field B.

4. What is 'retentivity' in magnetism ?

5. Where on the earth.s surface is the magnetic dip zero ?

6. State Lenz's law.

7. Write the condition for .resonance. of series

LCR circuit.

8. What is wattless current?

9. A blue ray of light enters an optically denser medium from air. What happens to its frequency in denser medium ?

10. $_{92}U^{238}$ undergoes α-decay giving rise to thorium. What is the mass number of the daughter nuclide ?

Part B

1. Represent graphically the variation of resistivity with absolute temperature for copper and nichrome metals .

2. Write an expression for cyclotron frequency and explain the terms .

3. State and explain 'Curie's Law' in magnetism

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4. Mention any two factors on which the self

inductance of a coil depends.

5. Give any two applications of ultraviolet radiations.

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6. What is polarisation of light ? Name any one method of producing plane polarised light.

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7. Calculate de Broglie wavelength associated with an electron moving with a speed of $2 \times 10^5 ms^{-1}$. Given $h = 6.625 \times 10^{-34} JS, m_e = 9.11 \times 10^{-31} kg$.

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8. Write any two advantages of Light Emitting Diode (LED) over conventional incandescent low power lamps .

Part C

1. Write any three properties of magnetic field lines.

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2. Obtain an expression for effective Capacitance of two Capacitors Connected in series.

3. Write any three differences between diamagnetic and paramagnetic materials .

4. Describe the coil and barmagnet experiment to demonstrate the phenomenon of electromagnetic induction.

5. Derive the expression for effective focal length of two thin lenses kept in contact.

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6. Write any three experimental observations of photoelectric effect

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7. Explain the working of a zener diode as a voltage regulator.

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8. What is the function of 'receiver' in communication system ? Draw the block diagram of A.M-receiver .

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Part D

1. Using Gauss's law in electrostatics, obtain an expression for electric field due to a uniformly charged thin spherical shell at a point

(i) Outside the shell and

(ii) Inside the shell

2. Derive $\sigma = \dfrac{ne^2\tau}{m}$ where the symbols have their usual meaning.

3. Obtain an expression for the force between two straight parallel conductor carrying current. Hence define ampere.

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4. Obtain the expression for fringe width in the case of interference of light waves.

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5. Draw the circuit arrangement for studying the V - I characteristics of a p-n junction diode in (i) forward and (ii) reverse bias. Briefly explain how the typical V - I characteristics of a diode are obtained and draw these characteristics.

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6. Assuming the expression for radius of the orbit, derive an expression for total energy of

an electron in hydrogen atom.

7. The plates of a parallel plate capacitor have an area of $100 cm^2$ each and are separated by 3 mm . The capacitor is charged by connecting it to a 400 V supply .

Calculate the electrostatic energy stored in the capacitor .

8. The plates of a parallel plate capacitor have an area of $100cm^2$ each and are separated by 3 mm . The capacitor is charged by connecting it to a 400 V supply .

If a dieletric of dielectric constant 2.5 is introduced between the plates of the capacitor , then find the electrostatic energy stored and also change in the energy stored .

9. In the given circuit diagram, culculate: (i) The main current through the circuit and (i) Also current through 9Ω resistor .

10. A 20Ω resistor, 1.5 H inductor and $35\mu H$ capacitor are connected in series with a 220 V, 50 ac supply. Calculate the impedance of the circuit and also find the current through the circuit.

11. The radii of curvatore of two surfaces of a convex lens is 0.2 m and 0.22 m. Find the the forcal length of the lens if refractive index of the material of lens is 1.5. Also find the change in focal length, if it is immersed in water of refractive index 1.33.

12. The half life of $_{38}Sr^{90}$ isotope is 28 years. What is the rate of disintegration of 15 mg of this isotope? (Given Avogadro No $= 6.023 \times 10^{23}$)