2015 (A) Roll No: _____

INTERMEDIATE PART-II (12th CLASS)

PHYSICS PAPER-II (NEW SCHEME) TIME ALLOWED: 3.10 Hours

GROUP-II **SUBJECTIVE** MAXIMUM MARKS: 83

NOTE: - Write same question number and its part number on answer book, as given in the question paper.

SECTION-I

2. Attempt any Eight parts. **8 × 2 = 16**

(i) Show that N/C = V/m.

(ii) Define electron volt and prove that $1eV = 1.6 \times 10^{-19} J$

(iii) Electric lines of force never cross, why?

(iv) Is E necessarily zero inside a charged rubber balloon if balloon is spherical? Assume that charge is distributed uniformly over the surface.

(v) Why do parallel currents attract and opposite currents repel each other?

(vi) Why the voltmeter should have a very high resistance?

(vii) What should be the orientation of a current carrying coil in a magnetic field so that torque acting upon it is:- (a) Maximum (b) Minimum

(viii) If a charged particle moves in a straight line through some region of space, can we say that the magnetic field in the region is zero?

(ix) On what factors the self inductance of a coil depend?

(x) How energy losses in a transformer can be reduced?

(xi) How would you position a flat loop of wire in a changing magnetic field so that there is no emf induced in the loop?

(xii) Does the induced emf always act to decrease the magnetic flux through a circuit?

3. Attempt any Eight parts. **8 × 2 = 16**

(i) Write down the balance condition of Wheatstone bridge.

(ii) Why does the resistance of a conductor rise with temperature?

(iii) What are the difficulties in testing whether the filament of a lighted bulb obeys Ohm's Law?

(iv) What do you mean by Root Mean Square Value?

(v) How many times per second will an incandescent lamp reach maximum brilliance when connected to a 50Hz source?

(vi) Explain the conditions under which electromagnetic waves are produced from source?

(vii) Define any two types of Elastic Constants.

(viii) Define Superconductor. Give its example.

(ix) What is meant by hysteresis loss? How is it used in the construction of a transformer?

(x) What is the net charge on a $n-$type or a $p-$type substance?

(xi) Why a photo diode is operated in reverse biased state?

(xii) Write down the logic expression and table for Exclusive OR Gate.

4. Attempt any Six parts. **6 × 2 = 12**

(i) Will bright light eject more electrons from a metal surface than dimmer light of the same colour?

(ii) When light shines on a surface, is momentum transferred to the metal surface?

(iii) Why do not we observe a Compton effect with visible light?

(iv) Is energy conserved when an atom emits a photon of light?

(v) What are the advantages of Lasers over ordinary light?

(vi) If someone accidentally swallows an $\alpha-$source and a $\beta-$source, which would be the more dangerous to him? Explain why?

(vii) How can radioactivity help in the treatment of cancer?

(viii) What are Isotopes?

(ix) What is Radioactivity?

SECTION-II (Essay Type)

NOTE: - Attempt any three questions. **8 ×3 = 24**

5.(a) Define Electric Potential. How can you find the electric potential at a point due to a point charge $'q'$? 5

(b) 0.75A current flows through an iron wire when a battery of 1.5 V is connected across its terminal (ends). The length of the wire is 5.0 m and its cross sectional area is $2.5 \times 10^{-7} m^2$. Compute the resistivity of iron. 3

6.(a) State Ampere's Law and find magnetic field due to a current carrying Solenoid. 5

(b) The back emf in a motor is 120V, when the motor is turning at 1680 rev per min. What is the back emf when the motor turns 3360 rev per min? 3

P.T.O

7.(a) What are the valence and conduction bands? Explain the difference amongst electrical behaviour of conductors, insulators and semiconductors in terms of energy band theory. 5

(b) A $100\,\mu F$ capacitor is connected to an alternating voltage of 24V and frequency 50 Hz. Calculate the current in the circuit. 3

8.(a) State and explain Uncertainty Principle. Also give its two mathematical forms. 5

(b) The current flowing into the base of a transistor is $100\,\mu A$. Find its collector current I_C, its emitter current I_E and the ratio I_C / I_E, if the value of current gain β is 100. 3

9.(a) Explain the principle, construction and working of Geiger-Muller Counter. 5

(b) Calculate the longest wavelength of radiation for the Paschen Series. 3

SECTION-III (PRACTICAL)

10. **(a) Give answers to any Four Questions.** **4 × 2 = 8**

(i) Does the tungsten filament of lighted lamp obey Ohm's Law?

(ii) Why NOT gate is known as inverter?

(iii) Draw the circuit diagram to find the internal resistance of voltmeter.

(iv) What is Ammeter, how is it connected in circuit to measure current?

(v) What is Digital System?

(vi) What is the Principle of Potentiometer?

(vii) What is Photocell?

(viii) What is Photoelectric effect?

(b) Write down the procedure for finding unknown resistance of wire using slide-wire bridge. 3

OR

Write down the procedure for studying the variation in current with intensity of light using Photocell.

(c) (i) What does the slope represent?
(ii) Find the slope of the graph. 4

Graph-A **OR** **Graph-B**