UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / First Semester – Fall 2023

Roll No. .....

Subject: Applied Physics Paper: MS-151 Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions. (15x2=30)

1. What is charge conservation?
2. Does electric field lines cross? Justify with reasons.
3. What is total internal reflection. Explain critical angle?
4. What is meant by conservative field? Is magnetic field a conservative field?.
5. Explain the law of refraction.
6. What is the relation between resistance and resistivity?
7. What is the effect of temperature on resistance?
8. If two parallel conductors have current in same direction, will they attract or repel each other?
9. Write two lines about solenoid.
10. Give the reason of light's dual nature?
11. Define electric potential and give its units.
12. Explain the effect of placing a dipole in an external electric field?
13. What are maxima and minima in interference pattern?
14. What is the reason behind colorful soap bubbles?
15. Tell briefly about diffraction gratings.

Solve the following questions.

Question no 2 (6+4)

I. Find an expression for the electric field due to an electric dipole.

II. Let we have a cylindrical surface of length L and radius b. Find flux through right, left and cylindrical wall.
Also calculate total flux through this closed cylindrical surface. $E = 200i$.

Question no 3 (6+4)

I. What is interference of waves? Give its types, what should be the phase difference for having a resultant wave of greater amplitude/intensity than individual amplitudes/intensities. Write in detail on double slit interference.

II. You have a piece of optical wire with a light beam traveling through it surrounded by a liquid with an index of refraction of 1.33. If the index of refraction of the wire is 1.85, what is the critical angle needed to achieve total internal reflection?

Question no 4 (6+4)

I. Define Lorentz force write its equation, give the condition when it becomes zero. Draw the vectors too.

II. An electron traveling at 23° with respect to a magnetic field of strength 2.63 mT experience a magnetic force of 6.48×10^{-17} N. Calculate the speed of electron ($m_e = 9.1 \times 10^{-31}$ kg) and the kinetic energy in eV.