25/5/24

DOON UNIVERSITY, DEHRADUN
End Semester Examination 2024, II Semester
Department of Physics, School of Physical Sciences
Course: PHG:151, 742411 Introduction toElectromagnetic Theory

Time Allowed: 2 Hours ***Maximum Marks: 50***

SECTION: A Attempt All Questions ***(Marks:1.5 X10=15)***

1. If **H(x,y,z,t)**=10 Sin(wt+kx) $\hat{y}$. Find out direction of propagation of EM wave.
2. What is magnetic field define B?
3. Write maxwell's 3rd equation for conservative electric field.
4. What is Magnetic flux?
5. What is Faraday's Law?
6. What is transformer and motional emf.
7. Write down continuity equation in electromagnetic theory.
8. Write down statement of Poynting theorem.
9. What is the difference between uniform plane and plane electromagnetic field.
10. Write down Stoke's theorem.

SECTION: B Attempt Any Three Questions ***(Marks:5 X3=15)***

11. What is scalar and vector potential? Write down Electric field and magnetic field in terms of scalar and vector potential.

12. Deduce Ampere's law from Bio-savart Law.

13. What do you mean by Electrostatic field and Magnetostatic field. Explain Divergence of magnetic field.

14. What do you mean by electrical capacitor of a conductor. Find out capacitance of parallel plate capacitor.

SECTION: C Attempt Any Two Questions ***(Marks:10 X2=20)***

15. State Gauss Divergence Theorem and find surface integral $\iint F.dS$, where F = (3x + z, y^2, xz) and $0 \leq x \leq 1$, $0 \leq y \leq 3$, $0 \leq z \leq 2$. (hint: Use Gauss Divergence theorem).

16. What are electromagnetic waves? How they produced? Establish equation forplane electromagnetic wave in free space also show that they are transverse in nature.

17. Write down Maxwell's equation (for electromagnetism) in integral as well in differential form also discuss generalized form of Ampere's law (Maxwell's contribution).