

Roll No. ....

24144

**B. Tech. (EE) 4th Semester (Re-Appear)  
Examination – October, 2020  
ELECTRO MAGNETIC THEORY (EMT)**

Paper : EE-208-F

Time : 1.45 hours ] [ Maximum Marks : 100

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt any *three* questions. All questions carry equal marks.

1. (a) Express the unit vector which is directed towards the origin from an arbitrary point on the plane  $z = -5$ .  
(b) Write down the Poissons equations.  
(c) State Coulomb's law.  
(d) List out the applications of Ampere's law.  
(e) Write down the equations for conductors.
2. (a) Explain the various types of coordinates system. Also explain how relations are converted from one coordinate system to another coordinate system.  
(b) Two vectors are given as  $A = 3a_x + 2a_y + 4a_z$  and  $B = a_x - 3a_y + 2a_z$ . Find the angle between A and B.

3. (a) State and prove Stoke's theorem.  
(b) State and explain Divergence theorem.
4. (a) State and prove the uniqueness theorem for electrostatic field.  
(b) Calculate electric field intensity due to a charged sphere having radius  $R$  and density  $\rho_v$  at point  $P(0, 0, z)$  in  $z$ -axis.
5. (a) State and prove Gauss's law for electrostatic field.  
(b) Discuss the various method of images.
6. (a) An infinite long straight filament carrying a current of 5 amp is placed along  $z$ - axis. Calculate the magnetic filed intensity at point  $P(1, 2, 2)$ .  
(b) State and prove Ampere's circuital law. Also express it in form of integral and differential form.
7. (a) Differentiate between scalar and vector magnetic potentials. Derive their expression.  
(b) How did Maxwell prove the inconsistency of Ampere's circuital law ? Discuss this.
8. (a) Derive the expression for propagation constant for a wave propagation in lossy dielectics.  
(b) Derive the wave equations for conductor media.
9. (a) Derive the formula for input impedance of a two wire transmission line.  
(b) The characteristic impedance of uniform transmission line is  $2000 \Omega$  at the frequency of  $1000 \text{ Hz}$ . At this frequency propagation constant is  $0.058 \text{ l}$ .  $80\%$ . Determine the values of  $R, L, G, C$ .