

SUBJECT: ELECTROMAGNETIC ENGINEERING

Day: Wednesday  
Date: 15/05/2019

S-2019-2704

Time: 10.00 AM TO 01.00 PM  
Max Marks: 60

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Assume suitable data if necessary.

- Q.1 a) Explain the concept of curl and Divergence. (05)  
b) Express the following points in cylindrical and spherical co-ordinates: (05)  
i) P (1, -4, -3) ii) Q (3, 0, 5)

OR

- Q.1 a) What is the significance of electromagnetic field? (05)  
b) If  $U = xz - x^2y + y^2z^2$ , evaluate  $\text{div}(\text{grad } U)$ . (05)

- Q.2 a) Determine the electric field due to continuous line charge. (05)  
b) What is Gauss law? Explain it. (05)

OR

- Q.2 a) What is divergence theorem? Explain it. (05)  
b) What is electric flux density? (05)

- Q.3 a) Explain the boundary condition of magnetic field. (05)  
b) What is Biot's Savart law? Explain it. (05)

OR

- Q.3 a) Determine the force on a current element. (05)  
b) What is Ampere's Circuital law? Explain the magnetic field intensity through infinitely long co-axial transmission line. (05)

- Q.4 a) Explain the Maxwell's equation. (05)  
b) What is displacement current? (05)

OR

- Q.4 a) State Faraday's law and explain it. (05)  
b) What is mmf in moving loop in static magnetic field? (05)

- Q.5 a) Determine the plane wave equation in free space and dielectric media. (05)  
b) State Poynting theorem and explain it. (05)

OR

- Q.5 a) Define the boundary condition of electromagnetic wave. (05)  
b) What is the effect on transmitted electromagnetic wave when it is reflected at normal incidence? (05)

- Q.6 a) Derive an expression for transmission line equation of lossless medium. (05)  
b) An air line has a characteristic impedance of  $70\Omega$  and a phase constant of  $3\text{rad/m}$  at 100 MHz. Calculate the inductance per meter and capacitance per meter of the line. (05)

OR

- Q.6 a) What is VSWR? (05)  
b) What do you mean by attenuation of waves? (05)