Total No. of Questions : 8] *[Total No. of Printed Pages : 3*

Roll No .....

EE-302-CBGS

B.Tech., III Semester

Examination, December 2020

Choice Based Grading System (CBGS)

Electromagnetic Field and Materials

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

iii) In case of any doubt or dispute the English version question should be treated as final.

1. a) Derive Laplace and Poisson's equation and show that they have unique solution. 7

   b) State Gauss's law. Derive its integral form. 7

2. a) Considering a parallel plate capacitor, explain the concept of energy density. 7

   b) Explain the phenomenon of polarization. What is polarizability. 7

3. a) Explain the boundary condition between two perfect dielectric. 7

   b) State and explain Ampere's circular law in integral and differential form. 7

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4. a) Compare diamagnetic material, paramagnetic material and ferromagnetic material. 7

   b) State and explain pointing vector theorem. 7

5. a) Describe the general form of plane electromagnetic waves. 7

   b) For a lossy dielectric material having μ_r=1, ε_r=48, σ =20 s/m, calculate the attenuation constant, phase constant and intrinsic impedance at a frequency of 16 GHz. 7

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σ=20 s/m,

6. a) Draw the typical B-H curve of soft and hard magnetic materials. Give reasons for their shape. 7

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B-H

   b) State the factors affect the resistivity of conducting materials. 7

7. a) What is P-N diode? Explain the common techniques used for the fabrication of PN diode. 7

   b) What is super conductivity? Explain neat developed in current carrying conductor. 7

8. Explain the following. **(any two)** : 14
   a) Band to band transition
   b) Hysteresis and Hall effect
   c) Mobility of charge carriers

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