THEORY EXAMINATION – JAN 2021		TIME – 3 Hrs 15 Min
B.TECH - ECE	**SEMESTER - V**	**M.M. - 56**

PAPER - EC-301	SUBJECT - ELECTROMAGNETIC WAVES

INSTRUCTIONS TO BE FOLLOWED

- **Allotted time for examination is 3 hours 15 minutes that includes time for downloading the question paper, writing answers, scanning of answer sheets and E-mailing the PDF files to the designated Email ID.**
- **For ECE-A Regular Students, the Email ID is:- btech5thecea@kuk.ac.in**
- **For ECE-B Regular Students, the Email ID is:- btech5theceb@kuk.ac.in**
- **The candidates will be required to attempt 75% of the question paper (maximum) by choosing to their any best questions accumulating 56 marks.**
- **The PDF files should be saved as Roll No. and Subject Code. Proper attention should be given while sending the email and in the subject line, the Roll Number and Subject Code should be mentioned.**
- **Maximum Page Limit should be 20 (Twenty) for attempting the question paper on A4 sheets which could be downloaded and printed from the sample sheets given in the Kurukshetra University Examination guidelines.**
- **Over-attemptation should be avoided.**
- **Handwriting should be neat and clean and diagrams should be clear and contrasted.**
- **The candidate should not write their Mobile No. otherwise Unfair Means Case will be made.**
- **While attempting the paper, the candidate will use blue/black pen only.**
- **Before attempting the paper, the candidate will ensure that he/she has downloaded the correct question paper. No complaint for attempting wrong question paper by the candidate will be entertained.**
- **Candidate must ensure that he/she has put his/her signature on each page of the answer sheet used by him/her. Answer sheet without the signature of the candidate will not be evaluated.**

PART-A

Q. No. – 1 Answer the following questions.   **15x1=15**

(i)	Write the expression of curl of a vector in Cartesian and Cylindrical coordinates
(ii)	Explain Poisson's equation in Electromagnetics.
(iii)	Explain the relation between Electric field E and Electric potential V
(iv)	Explain continuity equation of current.
(v)	Obtain an equation for force on a point charge 'Q' due to 'N' point charges.
(vi)	Define Magnetic field Intensity and Magnetic flux density
(vii)	Draw the equivalent circuit of a two wire transmission line.
(viii)	What do you understand by depth of penetration.
(ix)	How we can determine magnetic field intensity H from magnetic vector potential A
(x)	What are the applications of smith chart.
(xi)	Give the significance of BIOT SAVANT law.
(xii)	What is the physical significance of divergence of a vector field?
(xiii)	Define propagation constant.
(xiv)	Explain Reflection coefficient in Transmission line.
(xv)	Explain cut off frequency in waveguide.

PART-B

2	Explain procedures involved in converting point and vector from Cartesian to spherical coordinates.	5
3	Write short note on Magnetic Scalar and Vector potential.	5
4	Explain how we can differentiate between good conductor and dielectrics.	5
5	What do you understand by TE,TM and TEM modes. Which modes are possible in Waveguide. Also explain the cut off frequency in waveguide.	5

PART-C

6	For what purpose we are using method of images. Explain application of method of images with an example.	10
7	(a) State and explain the Gauss's law. Explain the applications of Gauss's law with Example. (b) Write short note on Uniqueness Theorem.	10
8	State and Prove Maxwell's equations in differential and integral form. Give their physical interpretation.	10
9	Explain boundary conditions for magnetic field.	10
10	Find the expression of Energy in electromagnetic wave in terms of Electric field and Magnetic field.	10
11	Derive the wave equations from the Maxwell's equations for free space.	10

12	With Constructional details Explain the working of Rectangular Waveguide. Also find The Expression of fields in Rectangular Waveguide.	10
13	(a) Explain the reflection coefficient and voltage standing wave ratio of a transmission line. (b) Write short note on Graphical Methods of Transmission line Analysis.	10