

**M. E. ELECTRONICS AND TELE-COMMUNICATION ENGINEERING 1ST YEAR 2ND SEMESTER
EXAMINATION, 2019**

Subject: Remote Sensing

Time: 3.0 Hours

Full Marks: 100

No. of questions	Answer any FOUR (4) question: 4×25	Marks
1	a) What do you mean by remote sensing? Differentiate between active and passive remote sensing process. b) Write a note on applications of remote sensing. c) Describe with suitable block diagram the principle and process of remote sensing.	8+7+10
2	a) Describe with suitable diagram the entire electromagnetic spectrum and specify which bands are used or not used in remote sensing purpose. b) Mention the advantages of microwave remote sensing. c) How permittivity of a dielectric material is measured using microstrip patch sensor.	10+5+10
3	a) Design a rectangular patch sensor which is mounted on a aircraft for mapping the Earth surface with following parameters: Thickness of substrate = 1.575 mm, dielectric constant = 2.33, operating frequency = 5 GHz. Derive the necessary equations you used. b) How the input impedance of this sensor is determined? c) Differentiate between satellite remote sensing and airborne remote sensing.	15+5+5
4	a) Describe the acoustic and near acoustic remote sensing process. b) How the RADAR can be used to accurately map rain forest area? c) How the resolution of an image obtained from RADAR is increased using Synthetic Aperture RADAR?	8+ 10+7
5	a) Draw and explain the basic block diagram of a remote sensing RADAR. b) If the range resolution of a pulse Radar is 30 m, determine the pulse width. c) Derive the simple form of remote sensing RADAR range equation. d) Mention the application of RADARs.	8+3+10+4
6	a) How a satellite can be used to observe the Earth as they go round in predictable orbit? b) Consider a satellite image which gives the information regarding the reflectance with wavelength. From this image how we can identify an object? c) Determine the power received from by a satellite located at 40000 km from an object which reflects all the power transmitted by the satellite. Satellite is operating at a frequency of 11 GHz and has effective isotropic radiated power (EIRP) of 21 dBW. The gain of a receiving antenna is 50.5 dB. Derive the necessary relations you used.	5+6+14
7	a) Describe the process of measuring the latent heat using radiometer. b) Describe with suitable diagram how the remote sensing technique is used in hydrology and hydrogeology	10+15