

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination May 17, 2020

Course: Thermal and Microwave Remote Sensing
Program: B. Tech. GIE
Course Code: PEGI 4005P

Semester: VIII
Time 03 hrs.
Max. Marks: 100

SECTION A

S. No.		Marks	CO
Q 1	<p>Multiple choice with single answer: The computed value of soil VWC, with given data, LST = 30 deg.; Tmin = 25 deg.; NDVI= 0.5; NDVImax = 0.85; NDVImin = 0.15; n =2; Ts max = 35 deg; Tc max = 25 deg.; Theta F = 0.8 and Theta R = 0.2 and Theta = 0.1, is</p> <p>a. 0.55 b. 0.43 c. 0.52 d. 0.30</p>	5	CO2
Q2	<p>True or false (Each question carry one mark):</p> <p>a. 4A/OP RT model is use for atmospheric correction TIR RS data. (T/F) b. LECTES method, the LSE is function of wavelength of various segments of TIR spectrum.(T/F) c. TVDI is found to be closely related with surface soil moisture content. (T/F) d. CWSI is applicable for both low and high vegetation conditions. (T/F) e. High spectral convolution method is a vicarious calibration method of ITR RS data. (T / F)</p>	5	CO1
Q3	<p>Multiple choice with single answer: The Fresnel surface reflection of horizontal and vertical polarization computed using given parameters – dielectric constant = 5 and the viewing angle theta = 40 deg., are</p> <p>a. 0.335, 0.441 b. 0.223, 0.283 c. 0.441, 0.515 d. 0.115, 0.225</p>	5	CO3
Q4	<p>True or false (Each question carry one mark):</p> <p>a. Eigenvalue is use for computation of alpha parameter from PolSAR RS data (T/F). b. In RTI method of SAR data is collected from two positions with same viewing geometry (T/ F) c. Microwave brightness temperature increases with all incidence angles in vertical polarization. (T/F) d. Real part of dielectric constant increases with increase in soil moisture. (T/F) e. The HH / VV ratio of PolSAR RS data is called depolarization ratio. (T/ F)</p>	5	CO3
Q5	<p>Fill in the blanks (Each question carry one mark):</p> <p>a. ----- SAR scattering model is use for soil moisture estimation when surface r.m.s. height less than wavelength of MW radiation. b. ----- and ----- surface structural features are well identified in SAR Image.</p>	5	CO3

	<p>c. CPR index derived from PolSAR satellite data helped in identification of moon----- and ----- parameters.</p> <p>d. Scattering by ----- is used for estimation of rainfall over land using passive microwave satellite radiometer data.</p> <p>e. Error of co-registration of SAR images during InSAR analysis reduces ----- of SAR images.</p>		
Q6	<p>Multiple choice with single answer:</p> <p>LST computed with Landsat 5 thermal band data using given data – emissivity = 0.8; To = 30 deg; w = 0.5; a = - 67.35; b= 0.46; Ti = 35 deg., is</p> <p>a. 47.1 b. 46.5 c 45.7 d. 43.4</p>	5	CO1
SECTION B			
	Instructions: Write short notes / Describe briefly		
Q 7	Explain the principle and analysis steps of method of retrieval of LSE and LST using ASTER TIR & MIR data.	5 + 5	CO2
Q 8	Describe briefly applications of remote sensing derived land surface temperature and spectral vegetation index combinely in various areas of water resources.	10	CO2
Q 9	Write brief notes on various approaches of applications of SAR polarimetry in agriculture and forestry. What are the factors affect range and azimuth spatial resolutions of SAR. Explain the technique use for improving azimuth spatial resolution of SAR RS system	5 + 5	CO3
Q 10	What are the advantages and disadvantages of SAR interferometric method of DEM generation in comparison to optical stereo photogrammetry. Explain briefly the principle of Radar grammetry. Write the advantages of microwave RS in comparison to optical RS in geosciences applications.	2+ 4 + 4	CO4
Q 11	Write short notes on principles of applications of LiDAR in bathymetry and vegetation studies. Briefly discuss the approaches of various areas of applications of microwave in Geosciences.	5 + 5	CO5
SECTION-C			
Q 12	Discuss in details principles of soil moisture estimation using microwave RS techniques. What are the advantages and disadvantages of active and passive MW RS techniques in soil moisture estimation. Describe various approaches of estimation of soil moisture using active microwave RS techniques. OR Explain in details principle of InSAR and DInSAR techniques. Describe various factors to be consider in InSAR analysis. Discuss various approaches of estimation of soil moisture using passive microwave RS technique	7 + 3 + 10 6 + 4+ 10	CO4