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| Name: |  UPES UNIVERSITY WITH A PURPOSE |
| Enrolment No: | |

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination (2nd Attempt), July 2020

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| Course: Thermal and Microwave Remote Sensing Program: B. Tech. GIE Course Code: GIEG 423 | Semester: VIII Time 03 hrs. Max. Marks: 100 |
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SECTION A

| S. No. | Instructions: Fill the blank spaces / Tick the correct answer | Marks | CO |
|--------|---|-------|-----|
| Q 1 | The computed value of soil VWC, with given data, LST = 30 deg.; Tmin = 25 deg.; NDVI= 0.5; NDVI _{max} = 0.85; NDVI _{min} = 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 a. 0.55 b. 0.43 c. 0.52 d. 0.30 | 5 | CO2 |
| Q2 | Coefficient of absorption of a thermal channel used in SW algorithm is computed by following ground based and simulated methods using six input data and these are -----, -----, -----, -----, -----, -----. | 5 | CO1 |
| Q3 | The Fresnel surface reflection of horizontal and vertical polarization computed using given parameters – dielectric constant = 5 and the viewing angle theta = 40 deg., are a. 0.335, 0.441 b. 0.223, 0.283 c. 0.441, 0.515 d. 0.115, 0.225 | 5 | CO3 |
| Q4 | Five common vegetation biophysical parameters affect Radar backscattering are -----;-----;-----;-----;----- | 5 | CO3 |
| Q5 | -----;-----;-----;-----;----- are the general surface interaction mechanisms of SAR remote sensing data. | 5 | CO3 |
| Q6 | 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 a. 47.1 b. 46.5 c 45.7 d. 43.4 | 5 | CO1 |

SECTION B

| | Instructions: Write short / brief notes on: | | |
|------|--|-------|-----|
| Q 7 | Explain the principle and limitations of TIR satellite data calibration method using high spectral resolution TIR satellite as reference. Describe the analysis steps of this method. | 5 + 5 | CO2 |
| Q 8 | Write three each advantages and disadvantages of TIR remote sensing. Briefly describe physical concept of Thermal Inertia and its applications in natural resources inventory. | 5 +5 | CO2 |
| Q 9 | What are the sensor system and object characteristics factors affect SAR polarimetric interaction with object? Write shot notes on various approaches of applications of SAR polarimetry in agriculture and forestry | 5 + 5 | CO3 |
| Q 10 | Write short notes on principles of applications of LiDAR in bathymetry and vegetation studies. Explain how phases of SAR return signals affect quality of SAR image and procedures to improve image quality. | 5 + 5 | CO5 |

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| Q 11 | <p>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.</p> <p style="text-align: center;">OR</p> <p>What are the advantages of microwave RS in comparison to optical RS in geosciences applications? Briefly discuss the approaches of various areas of applications of microwave in Geosciences.</p> | <p style="text-align: center;">5 + 5</p> <p style="text-align: center;">4 + 6</p> | CO4 |
| SECTION-C | | | |
| Q 12 | <p>Explain in details factors affecting soil moisture estimation using passive microwave RS technique and discuss various approaches of estimation of soil moisture using passive microwave RS technique</p> <p style="text-align: center;">OR</p> <p>Discuss in details principles of soil moisture estimation using microwave RS techniques. Describe various approaches of estimation of soil moisture using active microwave RS techniques.</p> | <p style="text-align: center;">10 + 10</p> <p style="text-align: center;">8 + 12</p> | CO4 |