UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination, January, 2021

Course: Remote Sensing in Geosciences **Semester: I**
Program: M. Sc. Petroleum Geoscience **Time 03 hrs.**
Course Code: PEGS 7107 **Max. Marks: 100**
No. of pages: 3

SECTION A

S. No.	**Instruction: Each sub question under main question carry one mark.**	**Marks**	**CO**
Q 1	**True or False** a. The NDWI hyperspectral index is generally used detect hydrocarbon micro-seepage induced vegetation stress. b. Oil has higher thermal conductivity than reservoir rocks c. Sandstone landscape is dominated by dendritic drainage. d. The flatirons develop wherever inter-bedding of hard and soft rocks exists. e. Satellite derived SAVI values are low where surface temperature are high due to coal fire.	**5**	**CO2**
Q2	**Multiple choice with single answer** a. Marble dominated landscape, generally show _____drainage density. (i) Fine; (ii) High; (iii) Coarse; (iv) Moderate. b. The_____drainage pattern is developed in a narrow valley flanked by steep ranges. (i) Trellised; (ii) Dendritic; (iii) Pinnate; (iv) Annular. c. Sulphate has characteristics spectral absorption feature in_____ spectral region. (i) MIR; (ii) SWIR; (iii) Visible; (iv) TIR. d. A long sloping surface opposed by an escarpment is called_____. (i) Plunging fold; (ii) Inclined bed; (iii) Strike ridge; (iv) Cuesta e. Hydrocarbon bearing materials show characteristics absorption features in_____ spectral region (i) TIR; (ii) SWIR, (iii) MIR; (iv) NIR.	**5**	**CO3**

Q3	**Multiple choice with single answer** a. NTI index is computed using MODIS two bands viz. (i) R22 and R30; (ii) R 22 and R32; (iii) R21 and R32; (iv) R22 and 33. b. The _____ is used for exploration of tin deposit. (i) Prophyry; (ii) Gerisen; (iii) Pegmatities; (iv) Placer c. Joints characterize by _____drainage pattern (i) Trellised; (ii) Dendritic; (iii) Rectangular; (iv) Radial d. Landsat MSS 3/MSS 4 band ratio can be used to identify _____ mineral. (i) Goethite; (ii) Limonite; (iii) Hematite; (iv) Limestone e. The _____satellite is useful to monitoring terrestrial water mass. (i) MOPITT; (ii) ASTER; (iii) GRACE; (iv) Icesat	**5**	**CO4**
Q4	**True or False** a. Increase in pore water pressure, increases shear strength of rock. b. Lidar data is effective in mapping landslide under forested areas in hilly region. c. In confined aquifers the water is contained under pressure lower than the atmospheric pressure. d. Growth fault is popular hydrocarbon habitat in deltaic sequence environment. e. The loess marks are characteristics of fluvial terrain.	**5**	**CO3**
Q5	**Multiple choice with single answer** a. B & W Infrared aerial photograph covers spectral wavelength of _____ (i) 0.7 – 0.9 micro m; (ii) 0.5 – 0.9 micro m; (iii) 0.4 – 0.9 micro m; (iv) 0.6 – 0.9 micro m b. Roberts edge detection filter uses _____elements of mask (i) 9; (ii) 6; (iii) 4; (iv) 5 c. Projective model used in spatial interpolation during geometric correction of satellite data uses _____ parameters. (i) 4; (ii) 6; (iii) 12; (iv) 8 d. Path radiance detected by remote sensing sensor consists of _____ (i) Reflectances from object & neighbouring area; (ii) Reflectance from neighbouring area & scattered radiation from the atmosphere; (iii) Reflectance from object & scattered radiation from the atmosphere; (iv) Only scattered radiation from the atmosphere. e. The spatial resolution of IRS - AWiFS sensor is _____ (i) 60m; (ii) 70m; (iii) 56m; (iv) 50m	**5**	**CO2**
Q6	**True or False** a. Passive remote sensing technique detect on emitted radiation from object. b. Two electromagnetic radiation having a phase shift of 180 degree is called to be in phase.	**5**	**CO 1**

	c. SWIR spectral bands are more affected by Rayleigh scattering. d. IRS – LISS IV sensor has one SWIR band in addition to visible and NIR bands. e. For identification of vegetation in multi-spectral remote sensing data spectral band ratio – NIR/R is very useful.		
SECTION B			
	Instructions: Write short notes / Describe briefly		
Q 7	Write five advantages of oblique aerial photograph over vertical photographs. Describe briefly FLAASH method of atmospheric correction of satellite data	**5 + 5**	**CO2**
Q 8	Write short notes of four Electromagnetic radiation laws commonly used in remote sensing. What are the challenges of remote sensing?	**7 + 3**	**CO1**
Q 9	Give five examples of geomorphology and terrain association. Describe briefly methodology and criteria for selection of various ground water recharge structures of Rajiv Gandhi National Drinking Water Mission – Ground Water Prospect Mapping.	**3 + 7**	**CO4**
Q 10	Write the RS derived image and terrain characteristics used for identification of sedimentary rock shale. Which are the cations, anions and chemical constituents of rocks give characteristics absorptions in SWIR and TIR regions of EMR.	**5 + 5**	**CO3**
Q 11	Describe with diagrams approaches of identification of geological structure - fold using remote sensing derived drainage pattern.	**10**	**CO3**
SECTION-C			
Q12	**Instruction: Attempt any one question**		
	Describe in details the various approaches of RS techniques used for hydrocarbon exploration.	**20**	**CO 4**
	OR		
	Discuss in details Remote Sensing based approaches of neo-tectonic evidences used for seismic hazard zonation. Give an account of techniques of subsurface coal fire detection using Remote Sensing data.	**12 + 8**	**CO 4**