# UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

**End Semester Examination –December, 2017**

**Program/course: B.TECH/ GSE**                    Semester – V
**Subject: GIS & Satellite Navigation Systems**     **Max. Marks   : 100**
**Code    : GIEG 313**                              **Duration      : 3 Hrs**
**No. of page/s: 02**

**All questions are compulsory**.

**SECTION –A**                    **[20 marks]**

Ques1. a) Given the longitude of a place, how would you find out the UTM Zone for that place?

**2 marks**

b) What is a map projection and why do all maps "lie?" **4 marks**

c) Differentiate between a one-to-one relationship and a many-to-one relationship between tables?

Give examples. **4 marks**

Ques2.  a) Explain the term Subtype and its importance? **2 marks**

b) What are the three parts within a spatial reference that are specified while creating a feature

class in a geodatabase? Explain each. **3 marks**

c) What is a domain and why would you use it? Explain the different types of domains with

examples? **5 marks**

**SECTION –B**        [**10 X 4 = 40 marks**]

Ques3. a) Briefly describe any four Raster Analysis techniques with suitable examples? **4 marks**

b) Provide any three specific examples of applications using geometric network modelling in their

workflows and specify how geometric network modelling is useful in those applications?

**6 marks**

Ques4. a) List any four environmental variables that should be set before starting your geoprocessing

operations? **2 marks**

b) Differentiate between Buffering and Proximity Analysis in vector geoprocessing. **2 marks**

c) What is Geometric Dilution of Precision? What are its types? **6 marks**

Ques5. List and explain the errors that are associated with absolute GPS positioning? **10 marks**

Ques6. What is a geodatabase and describe the advantages of working in a geodatabase? **10 marks**

# **SECTION –C** [40 marks]

Ques7. a) Define and describe the Universal Transverse Mercator coordinate system? What type of developable surface is used with a UTM projection? What are the UTM zones, where is the origin of the zone and how are negative coordinates avoided? How measurements are made within a UTM system? Illustrate the UTM system with a suitable diagram. **10 marks**

b) What four types of information can be distorted by map projection? What projections are used to get rid of these distortions individually? Illustrate your answer by citing appropriate applications for these projections individually. **10 marks**

Ques8. a) Give the steps involved in a geodatabase development process, detailing the steps involved at each of the conceptual, logical, and physical design phases. 10 marks

b) You are newly employed at a small consultancy company specializing in GIS and map making. A small developing country in the northern hemisphere has problems with soil erosion due to vegetation change and a lack of drinking water. The United Nations, through the Indian foreign department, contracts your company to map;

- Vegetation and land use change for the last 15 years
- Demographic change during the same time period
- Availability of drinking water per person

The project budget allows you to buy satellite images to map vegetation and land use, and travel together with two colleagues to the country for field work and interviews. You have access to basic spreadsheets with demographic data (CIA world factbook). You have virtually no prior knowledge about drinking water availability and most likely have to interview local people. Your company has access to GIS workstations at home and GPS equipped tablet computers for fieldwork.

- Describe how you would tackle the problem, from designing the database, interpretation of satellite data, field check, interviews and cartographic layout. Sketch a map layout showing how you would present the data and include the sketch in your essay. **10 marks**