Full Marks: 70   **Time: 3 Hours**

<u>Q 1 and 6 are mandatory and answers any 4 taking at least 2 from each half. Marks of each question are shown on the right hand side. It is obligatory to write all parts of a question in a sequence.</u>

<u>First Half</u>

1. How do you reduce risk in mining by redesigning the task and work space? Discuss on JSI.   **10+5**

2. i) State the scale of heaviness of workload recommended by Astrand and Ramanathan.   **3+3+4**
   ii) How do you calculate rest allowances as proposed by Scientist Spitzer? Write down
      the occupational and non-occupational risk factors.

3. i) Write short notes on –   **3x2+4**
         Recovery heart rates, NCC, RCC
   ii) State the principal factors that can affect energy expenditure in performing a task in underground.

4. i) Write a note on recommended energy expenditure levels.   **3+4+3**
   ii) Give the assumption of Scientist Muller to predict rest between work. Site example as suitable.
   iii) What is WMSD?

5. i) State the factors that contribute to the development of CTD?   **6+4**
   ii) Distinguish between – Tendinitis Vs Bursitis

6. a. Define GIS.

    b. Describe the quadtree method of raster representation.

    c. What do you understand by active and passive sensors?

    d. Describe the methods of automatic classification used in GIS.

    e. Name the various image data characteristics.

    $(2+\frac{1}{4}+2+\frac{1}{4}+3)$

7. a. What do you understand by spatial topology? What are the rules of topological consistency of a space?

    b. With figure of two raster's A and B show the results of the operations "A and not B", "A xor B" and "A or B",

    $(7+3)$

8. a. What are the advantages and disadvantages of raster and vector representation?

    b. With a 5 X 5 raster assuming your own resistance value compute the minimal total resistance raster, in spread computation.

    $(5+5)$

9. a. Describe the steps involved in supervised image classification.

    b. Write short notes on:
    i. Maximum likelihood classifier
    ii. Minimum distance to mean classifier.

    $(3+7)$

10. a. What do you understand by contrast stretching? Describe linear contrast stretching and histogram equalized stretch of a remote sensing image.

    b. What is the purpose of buffer zone generation in GIS? Describe with two examples.

    $(7+3)$