Ref. No.: Ex/CE/PC/B/Geol/T/213/2024

B. E CIVIL ENGINEERING SECOND YEAR FIRST SEMESTER - 2024

Subject: ENGINEERING GEOLOGY

Time: 3 hours **Full Marks: 100**

PART A

Use a separate Answer-Script for each part (50 marks for each part)

Answer 1 and any five from the rest

1. Write short notes on (any three) **5x3 =15**

   a. Rock cycles

   b. Primary sedimentary structures

   c. Mineral

   d. Bowen's Reaction series

2. Draw and discuss the internal structure of the earth's interior. Show the discontinuities. **5+2=7**

3. Distinguish between normal, reverse and strike-slip faults. Under what stress conditions do they develop? Explain with sketches. **4+3=7**

4. What do you mean by the textural and compositional maturity of a sedimentary rock? What are the factors that influence metamorphism? **5+2=7**

5. What are the different forms and modes of igneous emplacement? Discuss the rate of crystal nucleation and growth as a function of temperature in the case of igneous rock formation. **3+4=7**

6. What is the importance of geology in the course of civil engineering study? **7**

7. What is Engineering Geology? Discuss the rock property for engineers. **2+5=7**

[Turn over

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PART B

Use a separate Answer-Script for each part (50 marks for each part)

Answer 1, 2 and any four from the rest

1. Choose the correct answer from the following: $1 \times 5 = 5$

i) The process of mechanical weathering includes:

a) thermal stress
b) spheroidal weathering
c) both (a) and (b)
d) none

ii) Seismic method of geophysical survey is important in engineering geological investigation as this can measure or detect:

a) overburden thickness
b) a fault zone
c) water resources
d) both (a) and (b)

iii) The structure of folded rocks can be studied by:

a) field mapping
b) rock core drilling
c) geophysical survey
d) none

iv) Decaying remains of dead plants can cause:

a) mechanical weathering
b) biological weathering
c) chemical weathering
d) both (a) and (c)

v) Granite affected by hydrolysis process of weathering by groundwater when detected after excavation of foundation for construction of a heavy structure results in:

(a) change in design;
(b) huge increase in construction cost;
(c) rejection of the site
(d) any one of (a), (b), or (c)

2. What are the three most abundant elements in the (a) the entire Earth. (b) the Earth's crust, and (c) the Earth's atmosphere? What are the possible causes of plate tectonics? **3+2 = 5**

3. Describe the seismic and gravity method of geophysical study. How do these help in the evaluation of subsurface geology? Name the instrument used in seismic survey to investigate subsurface areas covering shallow depth. How are pumping tests performed? **3+3+1+3 = 10**

4. Enumerate the causative factors of an earthquake. Illustrate and explain different types of seismic waves, focus, epicentre, and focal depth of an earthquake. **2+8 = 10**

5. Define and give examples of each of the following types of hazard (a) geologic hazard, (b) atmospheric hazard, (c) catastrophic hazard, (d) rapid onset hazard, (e) anthropogenic hazard.

2×5 = 10

6. What are the main volcanic hazards? Which of these have the greatest potential to cause damage at large distances from the volcano? What types of monitoring is necessary for short term prediction of volcanic eruptions? **5+2+3 = 10**

7. Write four processes responsible for chemical weathering. How may the weathering of granitic rock in the foundation of a concrete dam create construction problem? **7+3 = 10**