Total No. of printed pages = 4

**CE 181404**

6/6/24

Roll No. of candidate | | | | | | | | | | |



**2024**

**B.Tech. 4th Semester End-Term Examination**

**Civil Engineering**

**ENGINEERING GEOLOGY**

**New Regulation (w.e.f 2017-18) &**
**New Syllabus (w.e.f. 2018-19)**

Full Marks – 70 Time – Three hours

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The figures in the margin indicate full marks for the questions.

Answer Questions 1 any *four* questions from the rest.

1. Write the correct answer : (10 × 1 = 10)

(i) An open system is

(a) A System that can only exchange energy with its surroundings

(b) A System that does allow an exchange of energy

(c) A System that can exchange energy and matter with its surroundings

(d) All of these

(ii) In an engineering projects, the presence of syncline creates problem of

(a) Seepage and leakage in a dam foundation

(b) Constant seepage and sudden rush of water and flooding inside

(c) Both (a) and (b)

(d) None of these

(iii) Which of the following is a mineral?

(a) Coal

(b) Petroleum

(c) Natural gases

(d) Diamond

**[Turn over**

(iv) When a mineral tends to break easily along a definite plane is called _____. Whereas when it breaks along uneven plane and irregular manner is called _____.

(a) Fracture, cleavage (b) Streak, fracture

(c) Cleavage, fracture (d) Streak, cleavage

(v) Which of the following describe the Gabbro?

(a) Fine-grained, dark-colored igneous rock poor in silica

(b) Coarse-grained, dark-colored igneous rock poor in silica

(c) Fine-grained, dark-colored igneous rock rich in silica

(d) Coarse-grained, dark-colored igneous rock rich in silica

(vi) Breccia belongs to which type of sedimentary rocks

(a) Organic sedimentary (b) Chemical sedimentary

(c) Clastic sedimentary (d) All of them

(vii) Which of the following rock formed, under low grade metamorphism?

(a) Silt (b) Slate

(c) Schist (d) Gneiss



(viii) Which of the following statement is correct?

(a) Apparent dip is always less than the true dip

(b) Apparent dip is always greater than the true dip

(c) Apparent dip is always equal than the true dip

(d) True dip is always less than the apparent dip

(ix) In a fault, When foot wall appears to move downward along the fault plane relative to the hanging wall, the faults is

(a) Normal fault

(b) Reverse fault

(c) Thrust fault

(d) Horizontal fault

(x) When the forces tending to induce failure dominate over those tending to resist failure, the mass becomes stable? State true or false.

(a) True (b) False

2. Answer any *four* questions : $(4 \times 15 = 60)$

(a) Discuss various erosional and depositional landforms developed by river. (5+5 =10)

(b) Outline the engineering considerations of weathering. (5)

3. (a) Discuss briefly the various physical properties of rock forming minerals. (10)

(b) Illustrate the engineering consideration of clay minerals. (5)

4. (a) Define intensity and magnitude of an earthquake. What considerations and safety measures are required while designing buildings in a seismic region? (2+8 = 10)

(b) The ground acceleration at epicenter is 950 mm/sec$^2$ and at a seismic recording station is 625 mm/sec$^2$. The velocity of P-waves is 5.90 km/sec and S-waves is 3.25 km/sec. The S-P interval recorded is 17 seconds. Find the distance of the station from epicenter and depth of the focus. (5)

5. (a) Mention the three important civil engineering uses of rocks and list out the desirable properties of stone aggregates in relation to its various uses. (3+3 = 6)



(b) Explain the engineering considerations of faults. (4)

(c) Draw neat labeled diagram to show a rock bed with strike N60° E and dip of 50° SE. Calculate the depth of the bed at a distance of 200 m from the point where the bed exposed in the surface. (3+2 = 5)

6. (a) How do you explain the variations of grain sizes in igneous rocks? Mention the factors that control the metamorphism. (3+3 = 6)

(b) Explain the classification of sedimentary rocks giving suitable examples. Write the Civil Engineering importance of conglomerate and sandstone. (5+4 = 9)

7. (a) What is prospecting? Write the advantages and uses of geophysical prospecting. Mention different methods of geophysical prospecting. (1+3+2 = 6)

(b) Discuss how the stability of a dam is affected by the following geological structures of the bed rocks. (3+2+2+2 = 9)

(i) Dip and strike of beds.

(ii) Folds.

(iii) Faults.

(iv) Joints.

8. (a) Differentiate between intact rocks and rock materials. How core recovery and RQD are calculated from the study of rock cores obtained from drilling? State the method of measuring RQD of tunnel rock by volumetric joint count. (2+4+4 = 10)

(b) From a 30 m – deep drill hole, the core recovery for each 3 m run of drilling from the top towards the bottom is as follows : 0.2 m, 0.5 m, 1.5 m, 1.4 m, 1.9 m, 2.5 m, 0 m, 2.2 m, 2.6 m and 2.9 m. Calculate the rock quality of drill cores. (5)