3 (Sem–6/CBCS) GLG HC 1

2024

GEOLOGY

(Honours Core)

Paper : GLG–HC–6016

(Engineering Geology)

Full Marks : 60

Time : Three hours

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

1. Answer the following : selecting the correct option : 1×7=7

   (a) The lowest part of a tunnel is known as

   (i) adit

   (ii) invert

   (iii) stope

   (iv) None of the above

(b) Which of the following procedures is associated with rock bolting ?

(i) Grouting

(ii) Drilling

(iii) Tensioning

(iv) All of the above

(c) The resistance of shales and mudstones to wetting and drying can be analyzed in the laboratory by

(i) determination of its porosity

(ii) the slake durability test

(iii) determination of its compressive strength

(iv) direct shear test

(d) The movement of debris with a forward rotation along a slope, is termed as

(i) slump

(ii) flow

(iii) topple

(iv) fall

(e) In the expression $Q = \left[{}^{RQD}/_{Jn}\right]\left[{}^{Jr}/_{Ja}\right]\left[{}^{Jw}/_{SRF}\right]$, the term $\left[{}^{RQD}/_{Jn}\right]$ gives an idea about the

(i) stress condition within the rock mass

(ii) active effective stress

(iii) interblock shear strength

(iv) block size

(f) The minimum elevation up to which the water level in a dam-reservoir can be lowered and water still withdrawn with the help of outlets in a dam, is termed as

(i) dead storage level

(ii) tail water

(iii) minimum water surface

(iv) All of the above

(g) Which of the following does not fall directly under the roles of an engineering geologist ?

(i) Identification of difficult ground condition in a project area

(ii) Project cost-benefit analysis

(iii) Identification of source and quality of building materials

(iv) Environment impact assessment

2. Answer the following : 2×4=8

(a) Cite the salient features of a gravity dam.

(b) What are the uses of the rock mass rating (RMR) system

(c) State the use of landslide hazard zonation map ?

(d) Name *two* methods of determination of the strength of intact rocks.

3. Answers the following : ***(any three)*** 5×3=15

(i) What are various types of defects in rock mass ? Add a note on the various factors that form defects in rock masses.

(ii) What is the meaning of 'ground' in tunneling terminology ? Cite the characteristics of ravelling ground and swelling ground.

(iii) Name the *five* rock classes of the RMR system. To which class of rock would a rock mass be classified if the value of RMR is 85 ? Does RMR value of a rock mass give any indication of its shear strength parameters ?

(iv) Explain the process of rock bolting in jointed rocks. What is a dowel ?

(v) Outline the concept of landslide early warning system.

4. Answer the following : ***(any three)*** 10×3=30

(a) Discuss the role of an engineering geologist in the planning and construction of a multipurpose hydroelectric project in a hilly region comprising of folded strata.

(b) What are rock aggregates ? How are they used in civil engineering projects ? What are the qualities of good rock aggregates ?

(c) What is grouting ? Describe the various methods of grouting. Give an example of grout material.

(d) What are earth dams ? Discuss the problem of seepage and leakage in earth dams.

(e) Describe the method of determination of rock quality designation (RQD) by the direct method. Use neat sketches and numerical data for illustration.

(f) Write an illustrative account on the various types of preventive measures that are used to control landslides in hilly terrain.

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