CENTRAL INSTITUTE OF TECHNOLOGY KOKRAJHAR
(Deemed to be University)
KOKRAJHAR :: BTR :: ASSAM :: 783370

END – SEMESTER EXAMINATION
DIPLOMA

Session: July-December, 2022 Semester: Vth Time: 3 Hrs. Full Marks: 100

Course Code: DCE 501 Course Title: Construction Technology

ANSWER ANY FIVE QUESTIONS

1. a) Draw a typical cross section of one half of a one-way road showing foot path, kerb, stormwater drain, shoulder, carriageway with camber and traffic separator. (4)
   b) What are the elements of highway geometric design? What is superelevation and on which factors does it depend? (2+4=6)
   c) What is the eye level of the driver and what is the height of an object above a road surface considered for Stopping Sight Distance as recommended by the IRC? What do you mean by Overtaking Sight Distance? (2+2=4)
   d) Fill in the blanks of any six of the following: (6x1=6)
      i) IRC recommended width of a two-lane road with raised kerb is _____.
      ii) IRC recommended single lane roadway width for national highways in plains is ___.
      iii) Intermediate sight distance is _____ times the stopping sight distance.
      iv) The reaction time of a driver to assess stopping sight distance is _____.
      v) The width of shoulder of a road as per IRC is _____.
      vi) The IRC recommended ruling gradient for roads in mountainous terrain is 1 in ____.
      vii) Curves are provided in a road in order to achieve a _____.
      viii) The three-second rule is recommended for maintaining safe _____ distance.

2. a) What is the minimum distance between the running inner faces of two rails of a broad-gauge railway track? At what slope is the rim of the wheel of a railway vehicle is coned? Draw a typical single-lane section of a railway track in embankment. (2+2+4=8)
   b) What are the functions of sleepers in a railway track? What are the four types of sleepers generally used on Indian railways? (4+2=6)
   c) What are functions of railway ballasts? What materials are used as ballast? (4+2=6)

3. a) Classify bridges according to (i) materials of construction and (ii) types of super-structure. Draw a schematic diagram of a beam bridge and label its different parts. (4+4=8)
   b) What are the requirements for selecting a good site for a bridge across a river? (4)
   c) Draw a labelled sketch to show the different parts of a well foundation of a bridge? Describe with schematic diagrams the major three types of caissons as explained in class. (2+6=8)

4. a) Describe the situations in which (i) a concrete gravity dam, (ii) an embankment dam and (iii) an arch dam is considered suitable, and the mechanisms by which each of these three types of dam transfers the lateral load of water into the ground. Draw sketches to show a typical cross-section of the non-overflow section of each of these three types. (3x3=9)
   b) Describe any six criteria for selection of a site for constructing a dam. (6)
   c) What are the problems that may occur with the construction of a dam? (5)

5. Describe any four of the following by providing sketches wherever necessary: (4x5=20)
   a) the modes of failure of a concrete gravity dam
   b) the middle-third rule for the safety of a concrete gravity dam, and the location at the base of a concrete gravity dam where the maximum compressive force is produced for reservoir full case.
   c) functions of drainage and inspection galleries in a concrete gravity dam
   d) Contraction and construction joints in a concrete gravity dam
   e) Function and types of water stops as used for constructing a concrete gravity dam
   f) Consolidation and contact grouting at the base of a concrete gravity dam

6. Describe any four of the following by providing sketches wherever necessary: (4x5=20)
   a) types of embankment dams
   b) the modes of failure of an embankment dam
   c) the phreatic line and the flow net in the section of an embankment dam
   d) methods of controlling seepage through the foundation of an embankment dam
   e) methods of controlling seepage through the body of an embankment dam
   f) methods of protection of slopes of an embankment dam

7. Answer any four of the following by providing sketches wherever necessary: (4x5=20)
   a) Why are spillways provided? List the different types of spillways of dams.
   b) Describe the functions of river training works and their types.
   c) Describe the different alignments considered in planning a canal irrigation system?
   d) What are the constituents of typical distribution systems for canal irrigation?
   e) What are the advantages of lining an irrigation canal?
   f) Describe the various types of cross drainage works.