6. (a) A sample of sitty sand has a volume of $7*10^4$ mm^3. At the natural moisture content it weighs 1.478 N. The sample was then saturated with water and reweighed to a weight of 1.665 N. The sample was drained by gravity until it reached a constant weight of 1.434 N. The sample was then over dried at 105ºC until it reached a constant weight of 1.370N. Assuming unit weight of water as 9810 N/m^3 compute the following :

   (i) Water content under natural conditions.

   (ii) Volumetric water content under natural conditions.

   (iii) Saturation ratio under natural conditions.

   (iv) Porosity.

   (v) Specific yield.

   (vi) Specific retention.

   (vii) Water content at saturation.   25

   (b) (i) Explain the terms 'duty' and 'delta'. Derive a relationship between the two for a given base period.   10

   (ii) Write a brief note on the various factors affecting duty of water.   15

   (c) Write a detailed note on the various operations to be carried out for proper maintenance of irrigation channels.   25

7. (a) Design a trapezoidal shaped concrete lined channel to carry a discharge of 200 cumec at a slope of 30 cm/km. The side slopes of the channel are 1.5 :1.The value of N may be taken as 0.017. Assume limiting velocity in the channel as 2 m/s.   25

   (b) Explain in detail the various factors that are to be considered during the selection of site for the construction of a water resources project.   25

   (c) (i) Explain the terms "Storage Coefficient" and "Specific Yield".   10

   (ii) Explain the Recuperation Test and derive the formula for calculating rate of yield.   15

1(CCE.M)2

Civil Engineering—II

(06)

Time : Three Hours]   [Maximum Marks : 300

INSTRUCTIONS

(i) Answers must be written in English.

(ii) The number of marks carried by each question is indicated at the end of the question.

(iii) The answer to each question or part thereof should begin on a fresh page.

(iv) Your answer should be precise and coherent.

(v) The part/parts of the same question must be answered together and should not be interposed between answers to other questions.

(vi) Candidates should attempt question no. **1** which is compulsory and **three** more questions from any **two** Sections.

(vii) If you encounter any typographical error, please read it as it appears in the text-book.

(viii) Candidates are in their own interest advised to go through the General Instructions on the back side of the title page of the Answer Script for strict adherence.

(ix) No continuation sheets shall be provided to any candidate under any circumstances.

(x) Candidates shall put a cross (×) on blank pages of Answer Script.

(xi) No blank page be left in between answer to various questions.

(xii) No programmable Calculator is allowed.

(xiii) No stencil (with different markings) is allowed.

1. Answer any **three** of the following subdivisions, including (d) which is compulsory.

(a) With the help of a flow diagram explain the manufacture of ordinary cement in both the wet and dry process. 25

(b) What is the ballast in permanent way ? Mention the functions of ballast and state the requirements of a good ballast material. 25

(c) What is Unit Hydrograph ? Explain clearly the basic postulates of Unit Hydrograph theory. Describe how can you obtain the Unit Hydrograph from a flood hydrograph resulting from a storm of certain duration. 25

(d) Write short notes on the following :

(i) Hardy cross method

(ii) Metering in distribution systems. 25

SECTION–A

2. (a) Write a note on various types of special materials used in plastering. 25

(b) What do you understand by fire load ? How do you determine it ? 25

(c) Differentiate clearly between PERT and CPM network methods. 25

3. (a) Mention advantages, disadvantages and uses of sand-lime bricks. 25

(b) What do you mean by pointing ? Explain the different types of pointings. 25

(c) What is a milestone chart ? How does it differ from a bart chart ? How can a milestone chart be developed into a network ? 25

SECTION–B

4. (a) Draw a neat diagram of simple right-hand and left-hand turnout and show its various component parts. Explain the working principle of the turnout. 25

(b) What are the various types of traffic islands used ? Explain the uses of each. 25

(c) There is a horizontal highway curve of radius 400 m and length 200 m on this highway. Compute the set-back distances required from the centre line on the inner side of the curve so as to provide for :

(i) Stopping sight distance of 90 m

(ii) Safe overtaking sight distance of 300 m. 25

5. (a) Briefly explain the following :

(i) Negative super elevation

(ii) Cant deficiency. 25

(b) Explain total reaction time of driver and the factors on which it depends. Explain "PIEV" theory. 25

(c) Explain in detail the California resistance value method of flexible pavement design. 25