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BCE-036

01694

Diploma in Civil Engineering

Term-End Examination

December, 2010

BCE-036 : SOIL, ROADS AND AIRFIELDS

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt five questions. Question no. 1 is* ***compulsory****. Answer* ***any four*** *more questions out of questions no. 2 to 8. All questions carry* ***equal*** *marks. Use of calculator is permitted.*

1. Choose the correct answer. **7x2=14**

   (a) Uniformity coefficient can be expressed as :

   (i) D60/D10

   (ii) D60

   (iii) D10

   (iv) $D30^2/D60 \times D10$

   (b) A soil has a bulk density of 22 kN/m^3 and water content 10%. The dry density of soil is :

   (i) 18.6 kN/m^3.

   (ii) 20 kN/m^3.

   (iii) 22 kN/m^3.

   (iv) 23.2 kN/m^3.

(c) The height of fall of the rammer onto the soil in case of Standard Proctor Test is :

(i) 35.24cm.

(ii) 45.72cm.

(iii) 30.48cm.

(iv) 40.48cm.

(d) For sand soils, the most common method of stabilization is :

(i) soil cement stabilization.

(ii) mechanical stabilization.

(iii) soil lime stabilization.

(iv) soil bitumen stabilization.

(e) The roads connecting villages or groups of villages with each other and to the nearest road of a higher category are known as :

(i) State highways.

(ii) Major District Roads.

(iii) Village Roads.

(iv) Other District Roads.

(f) Transverse gradient of ABC runway pavements should not exceed :

(i) 1% (ii) 1.5%

(iii) 2% (iv) 2.5%

(g) The portion at the runway end from where an aircraft is permitted to land is known as :

(i) Apron (ii) Taxiway

(iii) Shoulders (iv) Threshold

2. (a) Using phase relationships, show that 5

$$n=\frac{e}{1+e}$$, where n = porosity, and

e = voids ratio.

(b) A soil sample has a porosity of 40%. The specific gravity of solids is 2.70. 3+3+3=9

Calculate :

(i) Voids ratio.

(ii) Dry density.

(iii) Unit weight if the soil is completely saturated.

3. (a) Describe the effect of moisture on compaction. 5

(b) The following are the results of a compaction test: 9

S.N.	1	2	3	4	5
Water content (%)	10	12	14.3	16.1	18.2
Dry density kn/m3	17.50	18.70	18.80	18.30	17.50

plot the water content, dry density curve and determine the optimum water content and maximum dry density.

4. (a) Discuss the desirable features of highway planning. 7

(b) Explain the guidelines for selection of alignment for "Desert Roads". 7

5. (a) Describe the considerations in the design of road embankment. 7

(b) Explain the operations involved in the construction of modern concrete roads. 7

6. (a) What do you mean by Terminal Area at an Airport ? Explain its significance. 7

(b) List the important characteristic of an aircraft. Explain any one in detail. 7

7. (a) What is wind rose diagram ? Explain its use in fixing direction of runway. 7

(b) Discuss the important factors required to be studied for improving the existing airport. 7

8. (a) What do you mean by basic runway length ? Explain the various corrections applied for runway length. 7

(b) Discuss the purpose of drainage at Airfield site. 7