Diploma in Civil Engineering

Term-End Examination

June, 2010

BCE-036 : SOIL, ROADS AND AIRFIELDS

01204

Time : 2 hours   *Maximum Marks : 70*

Note :   *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 alternative.   **7x2=14**

    (a)   Coefficient of curvature can be expressed as :

       (i) D_{60}/D_{10} (ii) $D_{60}^2/D_{30} \times D_{10}$

       (iii) $D^2_{30}/D_{60} \times D_{10}$ (iv) $D_{30}/D_{60} \times D_{10}$

    (b)   The water content of soil which represents the boundary between plastic state and liquid state is known as :

       (i)   Liquid limit   (ii)   Plastic limit

       (iii)   Shrinkage limit   (iv)   Plasticity Index

    (c)   The process in which air is expelled out of the voids by the application of pressure, and the soil particles are forced to move closer to give a denser packing is known as :

       (i)   Consolidation

       (ii)   Soil compaction

       (iii)   Compression

       (iv)   Soil stabilisation

(d) The important roads within a district serving areas of production and markets and connecting these with each other or with the main highways are known as :

(i) National Highways

(ii) State Highways

(iii) Other District Roads

(iv) Major District Roads

(e) A coat applied on a non-bituminous layer (gravel, WBM etc.) or a bituminous layer with the objective of securing a bond between that layer and the superimposed bituminous layer is known as :

(i) Prime Coat

(ii) Tack Coat

(iii) Mastic Asphalt

(iv) Final Coat

(f) Large span shed erect at the airport for the purpose of storing, servicing and repairing of aircrafts is known as :

(i) Terminal building

(ii) Hard standing

(iii) Hanger

(iv) Blast pens

(g) Longitudinal gradient of D and E runway pavements should not exceed :

(i) 0.5 %   (ii) 1.0 %

(iii) 1.5 %   (iv) 2.0 %

2. (a) Using phase relationships, show that 6
WG = Se
where W = water content, G = specific gravity; S = degree of saturation, e = voids ratio.

(b) The natural moisture content of soil is 20% and voids ratio is 0.75. If the specific gravity is 2.70, calculate the porosity, moist unit weight, dry unit weight and degree of saturation. **2+2+2+2=8**

3. (a) What do you mean by compaction ? Explain its significance. 5

(b) The results of standard proctor test on a medium grained sandy soil are as follows : 9

S.N.	1	2	3	4	5	6
Moisture content %	6.76	8.50	9.39	11.07	11.94	12.88
Dry unit weight KN/m3	19.61	20.72	20.38	19.24	18.60	17.69

Plot the water content - dry density curve and determine optimum water content and maximum dry density.

Assume G = 2.65 and V_w = 10 KN/m^3

4. (a) Describe the classification of roads in India. 7

(b) Explain the guidelines for selection of alignment for hill roads. 7

5. (a) What is meant by soil stabilisation ? Discuss its importance in road construction. 7

(b)   Describe the construction operations of   **7**
bituminous concrete. Also explain the
sequence of rolling adopted for a bituminous
concrete work.

6.   (a)   Describe the essential parts of an aircraft   **7**
with the help of a systematic sketch.

(b)   Explain the effect of Jet Blast and Fuel   **7**
spillage on pavements.

7.   (a)   Describe the scientific approach for   **7**
improving the existing airports.

(b)   Describe briefly the important factors to be   **7**
considered during the site selection of
airports.

8.   (a)   Explain the necessity of airport   **7**
classification.

(b)   Discuss the various geometric elements for   **7**
airport.

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