CSM – 12 / 15
Agricultural Engineering
Paper – I

Time : 3 hours

Full Marks : 300

The figures in the right-hand margin indicate marks.

*Candidates should attempt Q. No. 1 from Section – A and Q. No. 5 from Section – B which are compulsory and **three** of the remaining questions, selecting at least **one** from each Section.*

Section – A

1. Answer any **three** of the following :   20×3 = 60

   (a) What is surveying ? What are the principles of surveying ? Give general classification of surveying ?

   (b) With rough sketch, explain principle of operation of hydraulic ram.

   (c) What are the causes of water logging and advantages of drainage ?

DA – 49/3   (Turn over)

(d) Wheat crop requires 47 cm of irrigation water during 115 days irrigating period. How much land can be irrigated with a flow of 18 liters per second for 10 hours a day ?

2. (a) Explain about structures and devices used for underground pipeline system and mention common troubles encountered in underground pipe lines.

(b) What is drainage ? Explain, in brief, about different systems of drainage. 60

3. (a) Compute the discharge of a ractangular weir 40 cm long with a head of 10 cm under the following conditions :

(i) With no end contraction

(ii) With one end contraction

(iii) With two ends contraction

(b) Explain, in brief, about the following methods of evapotranspiration measurement :

(i) Lysimeter method

(ii) Soil moisture depletion method

DA – 49/3 (2) Contd.

(iii) Field experimental plots method

(iv) Water balance method   60

4.   (a) (i) Show the advantages and disadvantages of plane table surveying.

(ii) Find the angle between the lines OA and OB , if their respective bearings are :

(a) 32° and 148°

(b) 16° and 332°

(b) Define the following in brief :

(i) Reynold's number

(ii) Froude number

(iii) Hydraulic jump

(iv) Water application efficiency

(v) Drainage co-efficient   60

Section – B

5.   Answer any **three** of the following (not exceding **150** words each):

(a) (i) Explain the different types of water bearing formations.   15

(ii) Write short notes on the following : 5

(a) Coefficient of storage

(b) Area of influence

(b) (i) Give the procedure for estimation of runoff volume by curve number method.
10

(ii) Discuss on the various factors affecting runoff. 10

(c) (i) Discuss briefly on the different types of water erosion. 10

(ii) On a 3 per cent slope, calculate the horizontal spacing of contour bunds in medium rainfall areas and the length of bund per hectare. 10

(d) (i) What are the various steps in laying Water Bound Macca Dam (WBM) roads ? 10

(ii) Name the different types of roofs and explain them with sketches. 10

6. (a) Explain the classification of drilling equipments. 20

(b) A 10 m diameter well penetrates an 8m thick water bearing strata underlain and overlain by permeable beds. The well was operated with a constant discharge rate of 100 litres/ min for 12 hours. The steady drawdowns were found to be 3 and 0.05m distances 10m and 50m respectively from the centre of the well. Using Dupuit-Thiem equation, calculate the transmissibility and hydraulic conductivity of the aquifer.   20

(c) (i) What are the different types of bench terraces ? How are they designed ? 10

   (ii) Name the different types of masonry foundations and explain.   .   10

7. (a) (i) Write a detailed note on various types of well screen.   10

   (ii) Detail the prerequisites for designing a dairy farm.   10

   (b) (i) Write short notes on the following :   10

       (a) Chute spillway

       (b) Drop spillway

   (ii) Discuss briefly the applications of remote sensing and GIS in water resources development.   10

(c) Explain the different components of watershed management. **20**

8. (a) (i) Detail the methodologies adopted for development of wells. **10**

(ii) Give a detailed note on the various water harvesting measures. **10**

(b) (i) Write short notes on the following : **10**

(a) Threshing floor

(b) Silos for storage

(ii) Describe the various biological measures to control erosion. **10**

(c) (i) Discuss on the different classifications of land as to its capability. **10**

(ii) Write short notes on the following : **10**

(a) Safe bearing capacity of soil

(b) Unit hydrograph

(c) Transmissibility

(d) Contour stone wall

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