SEAL

Π ΕΠ(Π) 15

Sub. Code : **59**

Optional Paper

Agricultural Engineering : Paper-I

Time : **3** Hours / Maximum Marks : **200** / Total Pages : **32**

			Evaluation Table								(For Evaluator's Use Only)		
	PART-A				PART-B				PART-C			Grand Total	
QN	E-1	E-2	AC	QN	E-1	E-2	AC	QN	E-1	E-2	AC	PART-A	
1				21				33				PART-B	
2				22				34				PART-C	
3				23				35				Total	
4				24				36				(-) Marks	
5				25				37				Final Total	
6				26				38				Marks in Words	
7				27				39					
8				28									
9				29									
10				30								Remarks of Evaluator/Chief Evaluator	
11				31									
12				32									
13													
14													
15													
16													
17													
18												Remarks of Scrutiniser	
19													
20													
Total													
Evaluator's Sign													

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PART – A

Marks : 40

Note : Attempt all the **twenty** questions. Each question carries **2** marks. Answer should not exceed **15** words.

1   Define the Unit Hydrograph.

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2   What is Rainfall Intensity ?

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3   Define Wind Erosion.

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4   List factors affecting Water Erosion.

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5   Define Time of Concentration.

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6   Define Field Capacity.

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7   What is Evapotranspiration ?

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8   What do you mean by Hydraulic Radius ?

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9   Explain Hydraulic Conductivity.

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10 Explain Drainage Coefficient.

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11 What do you understand by Isobath Map ?

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12 Define Drainage Density.

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13   Define Net Positive Suction Head (NPSH).

14   Distinguish between aquitard and aquifuge.

15   Explain Transmissivity.

16   Explain Well Development.

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17   What is a Bench Mark ?

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18   Describe Contour Line.

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19 A wheat field needs to be irrigated with a depth of irrigation of 50 cm. The duration of the crop season is 125 days. Calculate the area that can be irrigated by a stream of the size of 15 lps applying for 15 hours a day.

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20 Calculate the discharge of a centrifugal pump rotating at a speed of 1440 rpm. The operating head of the pump is 16 m and the specific speed is 180.

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PART – B   **Marks : 60**

Note :   Attempt all the **twelve** questions. Each question carries **5** marks. Answer should not exceed **50** words.

21   Describe the Thiessen Polygon Method for determining average depth of rainfall over a watershed.

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22   Describe Rational Method for determining peak rate of run-off.

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23 Differentiate between Windbreak and Shelterbelt.

24 Write advantages and disadvantages of Drip Irrigation System.

25 Prove that most economical section of rectangular channel giving maximum discharge would be when the depth is half the breadth.

26 List the different methods of measurement of irrigation water and describe the Co-ordinate Method.

27 Write about Mole Drainage.

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28 Describe Bedding System of surface drainage.

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29   Draw characteristic curves of a Centrifugal pump.

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30   Describe principle of operation of a Centrifugal pump.

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31 Write about Basic Requirements of Well Screens.

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32 The length of line was observed to be 200 m when measured with a 20 m chain. If the chain was 7 cm too long, determine the correct length of the chain.

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PART -- C   Marks : 100

Note :   Attempt any 5 questions. Each question carries 20 marks. Answer should not exceed
          200 words.

33   Describe critically any one method of Land Levelling and Grading.

34 With the help of a neat sketch derive the expression $h = \sqrt{\dfrac{R \times VI}{50}}$ for determining height of water to be impounded behind the contour bund (m). In the above expression R is the 24 hour excess rainfall to be impounded (cm) and VI is the vertical interval between the consecutive contour bunds (m).

35 A stream of 135 litre per second was diverted from a canal and 100 litre per second were delivered to the field. An area of 1.6 hectare was irrigated in eight hours. The effective depth of root zone was 1.8 m. The run-off in the field was 432 cum. The depth of water penetration varied linearly from 1.8 m at the head end of the field to 1.2 m at the tail end. Available moisture holding capacity of the soil is 20 cm per metre depth of soil. Determine :

(i)   Water Conveyance efficiency

(ii) Water Application efficiency

(iii) Water Storage efficiency and

(iv) Water Distribution efficiency.

Irrigation was started at a moisture extraction level of 50 per cent of the available water.

36 Derive Hooghoudt's formula for determining spacing of sub-surface drains.

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37 Derive an equation for discharge of a well in an unconfined aquifer under steady state flow conditions. Describe the use of this equation for estimation of aquifer hydraulic properties.

38. In a tile drainage system the drains are to be installed at impervious layer existing at a depth of 2 m below the ground surface. The hydraulic conductivity of the soil is 1.8 m/day. The average discharge of the drainage system is 2 mm/day. Calculate the required spacing of the drains if the water table is to be kept at 1.5 m from the ground surface.

39 Calculate the average velocity of flow in the most economical rectangular channel if the depth of flow is 2 m. Consider the slope of the channel as 0.04% and the Manning's roughness coefficient as 0.025.

SPACE FOR ROUGH WORK