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ATd

2007

AGRICULTURE ENGINEERING (Optional) 000171

कृषि अभियांत्रिकी (वैकल्पिक)

Time : 3 hours] **[Maximum Marks : 200**

Note : *(i) In all attempt **Five** questions.*

*(ii) Question **No. 1** is compulsory.*

*(iii) Of the remaining questions, Attempt **Any four** by selecting **One Question** from each section.*

(iv) Numbers of optional questions up to the prescribed number in the order in which questions have been solved, will only be assessed and excess answers of the question/s will not be assessed.

(v) Candidate should not write roll number, any names (including their own), signature, address or any indication of their identity anywhere inside the answer book otherwise he will be penalised.

1. ***Attempt any four of the following :***

(a) A 4 cylinder engine has a cylinder 25 cm diameter, 50 cm stoke and runs at 154 revolutions per minute. If the engine fires once per two revolutions per minute and shows an indicated mean effective pressure of 7.5 kg/cm^2.

Calculate :

(i) IHP

(ii) BHP

Assume mechanical efficiency of the engine as 86.4 %. **10**

(b) Following velocities were recorded in a stream by means of a current meter :

Depth above bed, m	0.00	0.75	1.0	1.2	2.0	3.0	4.8	5.0
Velocity, m/sec	0.00	0.4	0.6	0.65	0.75	0.85	1.0	1.2

If the depth of flow at the point is 6m and the width of the section is 3m, determine the discharge. **10**

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(c) A 20 cm diameter well is pumped at a uniform rate of 2000 liter/min. Observations of drawdown were taken at 1 m and 100 m distance from the centre of the well and were found to be 10 m and 0.5 m respectively. Determine the hydraulic conductivity of the water bearing strata assuming the thickness of the saturated part of the aquifer to be 30 m. 10

(d) (i) Describe the process of pasteurization of milk. 4

(ii) What is the centrifugal method of creaming. List the factors influencing the fat percentage of cream. 6

(e) Define the following :

(i) Factors affecting soil erosion 4

(ii) Runoff 3

(iii) Hydrograph 3

Section - A

2. (a) Write short notes on the following :

(i) Disc Angle and Tilt Angle 5

(ii) Furrow Opener 5

(iii) Field Efficiency 5

(b) Write short notes on the following :

(i) Oil bath type air cleaner 5

(ii) Functions of lubricating oil in an engine 5

(c) Write short notes on the following :

(i) working of bio gas 5

(ii) conventional and Non-conventional energy sources 5

(iii) use of wind energy 5

3. (a) Write short notes on the following :

(i) Draw bar horse power 5

(ii) Advantages of sowing with seed drill over brood casting sowing 5

(iii) Parts of a Mould Board Plough 5

(b) Write short notes on the following :

(i) Carburetor 5

(ii) Working of a 4 stroke engine 5

(c) Write short notes on the following :

(i) Bio fuels 5

(ii) Working of solar dryer 5

(iii) Photo-voltaic cells 5

Section - B

4. (a) Write in brief about the following :

(i) Contour Bund 5

(ii) Utility of gully control structures 5

(iii) Bench terrace 5

(b) State the adoptability of the following :

(i) Cheek dams 5

(ii) Drop spillways 5

(c) Describe the following :

(i) Delineation of Watersheds 7

(ii) Universal Soil Loss Equation 8

5. (a) Explain the following :

(i) Graded Bund 5

(ii) Diversion drain 5

(iii) Staggered Trenches 5

(b) State the adoptability of the following :

(i) Chute spillway 5

(ii) Farm pond 5

(c) (i) Define equivalent depth in reference to design of sub-surface drainage system. 4

(ii) List important information required for planning a field drainage system. 6

Section - D

8. (a) Define the following terms :

(i) Angle of repose 5

(ii) Grading 5

(iii) Terminal velocity of grains 5

(b) (i) Discuss the principles of preservation of fruits and vegetables. 7

(ii) Differentiate between control and modified atmosphere for storage. 8

(c) List the different types of Poultry Houses used in India and describe any one of them. 10

9. (a) Write in brief about the following :

(i) Advantages and disadvantages of "Rotary Dryer". 7

(ii) Disc Separator. 8

(b) (i) Describe the basic principles of working of cold storages. 8

(ii) Describe the pre and post harvest treatments for minimizing the post harvest losses. 7

(c) Write in brief about the following :

(i) Different types of fencing. 5

(ii) Common building materials used at farm. 5

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(c) Describe in brief the following :

(i) Bifurcation ratio 5

(ii) Land capability classification 5

(iii) Satellite images 5

Section - C

6. (a) Define the following terms :

(i) Bulk density 5

(ii) Water requirement 5

(iii) Water holding capacity 5

(b) Describe the following terms :

(i) Irrigation scheduling. 5

(ii) Water application efficiency. 5

(iii) Advantages of using drip irrigation. 5

(c) (i) Explain the term "Drainage Coefficient". 4

(ii) Discuss the purpose of providing a gravel filter around sub-surface drains. 6

7. (a) (i) Undisturbed soil sample was collected from a field 2 days after irrigation when the moisture was near field capacity. The inside dimensions of the core sampler were 7.5 cm diameter and 15 cm deep. Weight of core sampling cylinder with moist soil was 2.76 kg. and that with ovendried soil was 2.61 kg. The weight of core sampling cylinder was 1.56 kg. Determine the depth of water in cm/m depth of soil. 10

(ii) Using Franci's formula compute the discharge of a rectangular weir 45cm long with a head of 12 cm with no end contractions. 5

(b) Write short notes on the following :

(i) Water front advance and recession curves in border irrigation. 5

(ii) Unit stream 5

(iii) Advantages of using sprinkler method 5

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