

AGRICULTURE ENGINEERING IFS-2000

PAPER-I

SECTION A

1. Answer any four sub-parts not exceeding 150 words for each sub-part
 - a. Describe the constructional features of different types of earth dams used for farm pond and reservoirs. Describe their functional design parameters. (10)
 - b. Describe different types of permanent structures used for preventing gully erosion with their salient features and suitability of adoption. (10)
 - c. Four hundred meter long graded bunds are constructed on an average slope of 2.5%. Vertical interval is 1.5m. The rainfall intensity for the time of concentration and for the recurrence interval is 16.5 cm/h. The run-off coefficient is 0.3. Estimate the design run-off rate of each bund. (10)
 - d. What are the objectives of soil loss equation and explain the procedure how the erosivity index and erodibility index are worked out. (10)
 - e. What are items on which attention is to be paid in planning of soil conservation strategy? (10)
2. (a) What do you understand by flood routing? Explain with the help of curves, the graphical method of flood routing. (15)
 - (b) Describe different stages of gully erosion. (5)
 - (c) Explain the phases involved in the design of permanent gully control structures. (10)
 - (d) Write short notes on any four: (10)
 - (i) Rain-gauge
 - (ii) Unit-hydrograph
 - (iii) USDA soil Classification
 - (iv) Stage recorder
 - (v) Ill effects of erosion
 - (vi) Command Area Development.
3. (a) State the merits and demerits of conventional and remote sensing approach for mapping of land use. (15)
 - (b) Describe different applications of remote sensing in water-shed management. (15)
 - (c) Describe the procedures for conducting large-scale remote sensing aerial photography. (10)
4. (a) What do you understand by CIS. How is this used in remote sensing applications. (15)
 - (b) Describe the method used in identification and mapping of land use. (15)
 - (c) Write short notes on any four: (10)
 - (i) Infra-red sensor
 - (ii) Thermal sensor
 - (iii) Geosynchronous satellite based aerial photography
 - (iv) Water bodies
 - (v) Active sensor
 - (vi) Land sat images

SECTION B

5. Answer any four sub-parts not exceeding 150 words for each sub-part:
 - (a) Discuss the main reasons for poor irrigation efficiencies in canal command areas. Suggest the steps for improvements. (10)
 - (b) Under what situation will you recommend the use of:
 - (i) Centrifugal pump

- (ii) Propeller pump
- (iii) Submersible pump on the farm? Draw the performance characteristic curve for centrifugal pump. (10)
- (c) A trapezoidal earthen channel is constructed with a bed slope of 0.03%. The bottom width is 2 m, depth of flow is 0.60 m, and the side slope of channel is 2:1. Calculate the discharge of the channel if the value of n is 0.025. (10)
- (d) State different methods of measuring evapotranspiration in the field. (10)
- (e) What are the requisites to be kept in mind while selecting well screens and also explain how the well development process is carried out to put the wells in use? (10)
- 6. (a) Describe the advantages and limitations of a sprinkler method of irrigation. What are different types of sprinklers used in the field? (15)
- (b) Describe the causes of water flooding on the farm. Describe different methods of field drainage with their suitability of adoption. (15)
- (c) Write short notes on any four: (10)
 - (i) Infiltration and percolation
 - (ii) Storage coefficient
 - (iii) Unconfined aquifer
 - (iv) Cavity wall
 - (v) Interceptor drain
 - (vi) Fertigation
- 7. (a) Design a farm workshop and an implement shed for a 100 ha farm, Show the layout plan in each case. (15)
- (b) Name different components of a modern farmstead. Give the plan-layout for a farm on the road-side. What factors will you consider for the safety of the farm from different destroying forces? (15)
- (c) A short R.C.C. column of size 230 x 230 mm is reinforced with 4 steel bars of 16 mm size. The compressive strength of the concrete is 4 N/mm² and that of steel is 190 N/mm². Estimate the safe load bearing capacity of the column. (10)
- 8. (a) Give the plan-layout of a godown for storing 100 tons of wheat in bags. Assume all necessary data. (10)
- (b) Give the layout of a water supply system for a family of 5 members to meet their all requirements. The source of water supply is shallow well. (10)
- (c) How is the cooling load estimated for designing a refrigerated cold storage structure for fruits and vegetables. (10)
- (d) Write short notes on any four: (10)
 - (i) Curing of R.C.C.
 - (ii) Seasoning of timber
 - (iii) Soaking pit
 - (iv) Trench silo
 - (v) Qualities of good bricks
 - (vi) Electric brooder

PAPER-II

SECTION A

1. Write short notes, not exceeding 150 words each, on any four of the following:
 - (a) Solar cooker
(10)
 - (b) Fuel ignition of IC engine
(10)

(c) Bio-gas plant

(10)

(d) Carburetor

(10)

(e) Levellers for land smoothing

(10)

2. (a) What is the difference in the power transmission systems of farm tractor and power tiller?

Explain with the help of neat sketches.

(25)

(b) What are the different types of lubrication systems in a tractor? Explain any one with the help of neat sketches.

(15)

3. (a) What are the different types of non-conventional sources of energy? Explain any two types, except bio-gas, in detail.

(25)

(b) What is the importance of inter-cultivation in farm crops? Explain different types of equipments used with bullock power for it. Support your answer with diagrams.

(15)

4. (a) How are threshers classified by

cylinders and concaves? Discuss with the help of sketches. Explain paddy thresher in detail with the help of diagrams.

(25)

(b) What are the precautions to be taken in installation and safety maintenance of electric motor in agricultural applications? Discuss in detail.

(15)

SECTION B

5. Write short notes, not exceeding 150 words each, on any four of the following:

(a) Processing of milk and dairy products

(10)

(b) Dehydration

(10)

(c) Control of agricultural engineering processes

(10)

(d) Methods of measuring temperature

(10)

(e) Screw conveyers.

(10)

6. (a) What are the important features of instrumentation amplifiers and how do they differ from ordinary operational amplifiers? Explain in detail.

(25)

(b) Explain the construction and working of a mechanical dryer. Use diagrams to elucidate your answer.

(15)

7. (a) What are the different types of material handling equipments? Discuss their utility in detail.

(25)

(b) Explain agricultural waste and any by product utilisation of rice husk under present conditions in detail.

(15)

8. (a) Draw layout of different processing equipments for cleaning and grading of grains. Explain with supporting diagrams.

(25)

(b) List out and explain the advantages of electronic operating systems and their practical applications in agricultural engineering.

(15)