B. Tech.
(SEM. V) (ODD SEM.) EXAMINATION, 2011-12
WATER RESOURCE ENGINEERING

Time : 3 Hours] [Total Marks : 100

Note :  
(1) Read the question carefully and answer them.
(2) Attempt all five questions considering the choices available within the question.
(3) Assume any data if not given.

1. Solve any four : 4x5=20

(a) Enumerate and explain the factors which necessitate irrigation.

(b) What do you understand by total planning concept of irrigation project?

(c) Discuss briefly the factor affecting the choice of the method of irrigation.

(d) Describe in detail sprinkler method of irrigation. Indicate the advantages and limitations of this method.

(e) Describe with the help of sketch various forms of soil moisture. Which of this soil moisture are mainly available for utilization by plants?
(f) Explain how frequency of irrigation is determined.
(g) Discuss briefly the factor affecting the consumptive use of water.

2 Solve any four: \(4 \times 5 = 20\)

(a) Write a brief note on the planning of canal align.
(b) Discuss in detail the various causes of losses of water in channels.
(c) Sketch a typical cross-section of a canal which is partly in cutting and partly in filling.
(d) Write a detailed note on the various operations to be carried out for proper maintenance of irrigation channels.
(e) Write a brief note on the planning of canal alignments.

(f) What do you understand by irrigation manager? How they can help in managing the canal irrigation.

(g) What is the role of farmer's participation in canal irrigation? Explain in brief.

3 Solve any two (from a,b,c,d,...2\times5=10\text{ marks}) 10+10=20
and Solve (e...10\text{ marks})

(a) Describe the various modes of sediment transport in an alluvial channel.

(b) What are the 'true regime' conditions in an alluvial channel as stipulated by Lacey?
(c) Explain the terms
(i) bed load;
(ii) suspended load;
(iii) critical tractive force.

(d) Compare Kennedy's and Lacey's theories for the design of irrigation channel in alluvial soil.

(e) Design an irrigation channel to carry a discharge of 5 cumec. Assume $N = 0.0225$ and $m = 1$.
The channel has a bed slope of 0.2 m per kilometer.

OR

Design on irrigation channel in alluvial soil according to Lacey's silt theory for the following data,

- Full supply discharge = 10 cumec
- Lacey's silt factor = 0.9

Side slope of channel = $\frac{1}{2} (H) : 1 (V)$

4. Solve any four:

(a) Differentiate between Bligh's creep theory and Khosla's method for the analysis of seepage below hydraulic structures.

(b) What is meant by 'Hydraulic jump' and how does it helps in designing irrigation structure?

(c) How does seepage endanger safety of a structure on permeable formation?
(d) What do you understand by theory of seepage? Explain in brief.

(e) Discuss the various factors affecting the suitability of aqueduct and syphon aqueduct.

(f) Describe Hind's method of design of transition.

(g) How do you make the assessment of water power potential of a hydroelectric scheme?

5. Solve any four:

(a) Describe with the help of neat sketches the various types of cross drainage work.

(b) Explain the method of fixing the waterway of drain in an aqueduct.

(c) Describe Mitra's method of hyperbolic transition. Drive the expression which represents this transition.

(d) Describe Bligh's approximate method of determining uplift pressure on the floor of the culvert of a cross drainage work.

(e) What is a fall in a canal? Why is it necessary to provide a fall in a canal?

(f) Discuss the various consideration according to which the location of a fall decided.

(g) Discuss the procedure for designing a Sarda type fall.