[3 Hours]   **[Total marks: 80]**

Note:

1) Question No. 1 is compulsory.
2) Attempt any **Three** questions out of remaining **Five** questions.
3) Assume suitable data wherever necessary.
4) Draw neat and clean sketches wherever necessary.

Q. 1. Explain the following: (20)

     a) Earth and Rock fill Dam

     b) Reservoir sedimentation Control

     c) Buttress dams and their advantages and disadvantages.

     d) Zones of storage reservoir

Q. 2 a) Describe the various component parts of a spillway. Explain their functions.   (10)

   b) Discuss various methods used for energy dissipation below spillways.   (10)

Q. 3 a) Explain the criteria for safe design of earth dam.   (10)

   b) Explain various methods to control seepage through foundations in earth dam.   (10)

Q. 4 a) Explain the various modes of failure of a gravity dam   (10)

   b) A concrete gravity has a maximum water level 150m, base level of dam 100m,

     tail water elevation 110m, base width of dam is 40m, location of drainage gallery is

     10m from u/s face which is assumed as vertical. Compute hydrostatic thrust and uplift force per metre lengthof dam at its base level. Assume 50%reduction in net seepage head at the location of the drainage gallery. Assume free board 3m and top width of dam as 7.5m.   (10)

Q. 5 a) Explain the method of determining principal and shear stresses in gravity dam.   (10)

   b)What do you understand by the elementary profile of a gravity dam? Derive expression for determining the base width of such a dam on any one criterion.   (10)

Q.6 Write short notes on: (20)

     a) Classification of hydraulic jump as per Froude No.

     b) Bligh's creep theory

     c) Control of cracking of dams

     d) Cross drainage works