

GUJARAT TECHNOLOGICAL UNIVERSITY**M.E Sem-I Examination January 2010****Subject code:711203****Subject Name: Design of Hydraulic Structures****Date: 25 / 01 / 2010****Time: 12.00 – 2.30 pm****Total Marks: 60****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Enlist the various forces acting on gravity dam as per IS -6512 and discuss in detail uplift and wave pressure. **06**
- (b) State the characteristics of Phreatic line with its uses. **06**
- Q.2** (a) Write the design procedure for spillway. **06**
- (b) Discuss in brief various methods for stability check of gravity dam. **06**
- OR**
- (b) Distinguish clearly between a low gravity dam and high gravity dam. Derive an expression used for such a distinction. **06**
- Q.3** (a) Check the stability of the gravity dam shown in **Fig-1**, Neglect earthquake effect. **06**
- (b) Calculate the stresses at the toe and heel for full reservoir condition for section of gravity dam given in above Q-3(a). **06**
- OR**
- Q.3** (a) Explain how do you account for earthquake effects in the design of gravity dam? **06**
- (b) Discuss the various type of Energy dissipation works. **06**
- Q.4** (a) Discuss the method of construction of flow nets for earth dam of anisotropic soil. **06**
- (b) Discuss the Swedish slip circle method for checking the stability of down stream slop under steady seepage condition. **06**
- OR**
- Q.4** (a) What are the different causes of failure of an earth dam? Discuss any one in detail. **06**
- (b) Write a note on prevention of piping in the earth dam. **06**
- Q.5** (a) Explain the method of locating Phreatic line in an earth dam without any drainage system at its toe. **06**
- (b) Find the discharge of seepage through an earth dam as shown in **Fig.-2**. Assume the following record. Permeability coefficient for dam material $K=4.8 \times 10^{-6}$ m/s and $\Delta a/a + \Delta a$ for $30^\circ = 0.36$. **06**
- OR**
- Q.5** (a) Explain briefly the properties and uses of flow net for earth dam. **06**
- (b) Discuss the criteria for safe design of earth dam. **06**

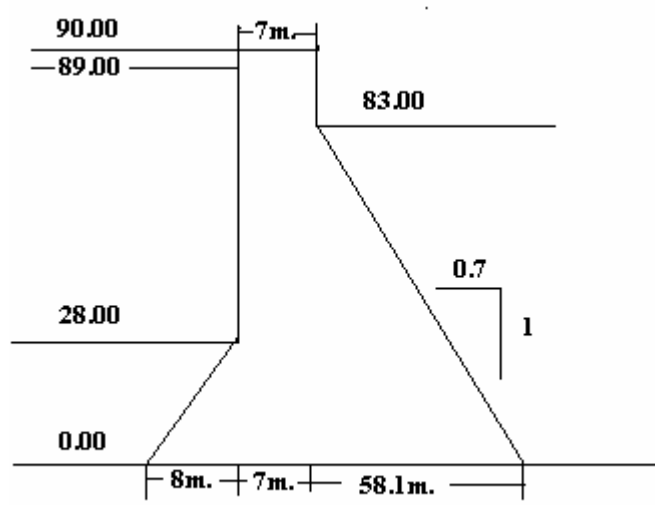


Fig-1, Q-3(a)

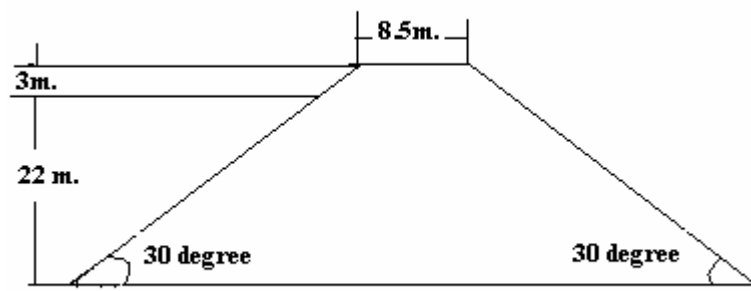


Fig-2, Q-4(b)