Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- IVth SEMESTER–EXAMINATION – MAY/JUNE- 2012

Subject code: 140902 **Date: 25/05/2012**

Subject Name: Electrical Power

Time: 10:30 am – 01:00 pm **Total Marks: 70**

Instructions:

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

Q.1 (a) Distinguish between a feeder, distributor and service main in distribution scheme show that the x-section of a feeder and distributor would be reduced to 1/k and $1/k^2$ of their respect value with an increase in working voltage by k times. **07**

(b) Why an old steam power plant cannot be used as an alternative to a pumped storage plant for peak load operation. Also discuss the merits and demerits of steam power plants. **07**

Q.2 **(a)** Mention the fields of application of gas turbine plants highlighting their relative merits over other conventional plants. What are the major disadvantages of such plants? **07**

(b) Compare over head line with underground cable as medium of power transmission, Also discuss the special features of alternators used in hydro plants. **07**

OR

(b) Give classification of hydro-electrical power plants. Draw a line diagram giving layout of a high head power plant and describe its working .Also discuss why are pump storage schemes employed in interconnected power system. **07**

Q.3 **(a)** Differentiate between open and closed gas turbine cycles discuss two methods for improving the efficiency of gas turbine plant. Why is a starting motor required in a gas turbine power plant . **07**

(b) Discuss how transposition helps in equalizing the capacitances in an unsystematically spaced 3-phase over head transmission line. Also discuss why is it preferable to use more than one conductor per phase rather than a solid or hollow conductor . **07**

OR

Q.3 **(a)** Explain the methods used for improving the voltage distribution along the string of insulators in over head lines (deduce the relation) **07**

(b) Explain with a neat diagram various parts of a nuclear reactor mentioning clearly the function of each part. Why in nuclear reactor multiplication factor is kept almost equal to one? **07**

Q.4 **(a)** What are the different substation? Draw the single line diagram of any one type of substation and list down the various equipment used in that substation. **07**

(b) Give the classification of steam turbines used in power plants. Also discuss the different methods of compounding of steam turbines. **07**

OR

Q.4 **(a)** What factors determine the economical limit of power factor correction? Show that the economical limit to which the power factor of a lagging power factor load can be raised is independent of the original. value of the power factor if the tariff consists of a fixed charge per KVA of maximum demand plus a flat rate per KWh. **07**

(b) What is solar energy? How solar energy may be utilized in generation of electric power? Explain with the help of neat-sketch **07**

Q.5 **(a)** Explain, why the effective grounding can be used only for systems operating on voltage below 3.3 KV or above 33 KV an resistance or reactance grounding is used for the systems operating on voltage between 3.3 KV and 33 KV. Also why effective a.c resistance is more than d.c resistance of a transmission line? **07**

(b) What do you understand by combine gas turbine plants ? what are their salient features. Discuss briefly the popular systems. **07**

OR

Q.5 **(a)** Write a short note in different types of insulator used for over head lines and their application. Show with the help of a neat-sketch, the electrostatic field of a pin insulator and explain how far the shape of modern insulator confirm to these requirements **07**

(b) A power plant consumes 3600 tons of coal per day. If the coal has an average content of 10,000 Btu/lb. what is the plant's power output? Assume an over all efficiency of 15 %. **07**

****