Printed Pages : 4          **TEE – 604**

# B. Tech.

## (SEM. VI) EXAMINATION, 2007-08

## POWER STATION PRACTICE

*Time : 3 Hours]*          *[Total Marks : 100*

*Note :*    *Attempt* **all** *questions.*

**1**    Attempt any **four** parts of the following :     **4x5=20**

   (a)   Briefly discuss the function of economizer in a thermal power plant.

   (b)   Briefly discuss the function of air preheater in a thermal power plant.

   (c)   Briefly discuss the function of cooling tower in a thermal power plant.

   (d)   What are the main considerations for selection of site for a hydro electric power station?

   (e)   Briefly describe Kaplan turbine used in hydro electric power station.

   (f)   Discuss in brief about hydro electric power potential in India.

**2**    Attempt any **four** parts of the following :     **4x5=20**

   (a)   Why is a moderator necessary in a nuclear reactor? What materials are suitable as moderator materials in a nuclear reactor?

(b) Discuss the advantages and disadvantages of a nuclear power station.

(c) Explain the working of a gas turbine plant with a schematic diagram.

(d) Draw the flow diagram of diesel power plant in brief.

(e) Discuss the operation of diesel power plant in brief.

(f) Why cannot diesel power stations be employed to generate bulk power?

3   Attempt any **two** parts of the following :          2x10=20

(a) Draw the key diagram of a typical 11kV/400V indoor sub station and explain it.

(b) The daily demands of three consumers are given below :

| Time | Consumer 1 | Consumer 2 | Consumer 3 |
|------|-----------|-----------|-----------|
| 12 midnight to 8am | No load | 200W | No load |
| 8am to 2pm | 600 W | No load | 200 W |
| 2pm to 4pm | 200W | 1000W | 1200W |
| 4pm to 10pm | 800 W | No load | No load |
| 10pm to 12 midnight | No load | 200W | 200W |

*Plot the load curve and find :*

(i) maximum demand of individual consumer

(ii) diversity factor

(iii) load factor of individual consumer

(iv) load factor of the station.

(c)  A system is working at its maximum kVA
     capacity with a lagging power factor 0.7.
     An anticipated increase of load can be met
     by one of the following two methods:

     (i)   By raising the p.f. of the system to 0.866
           by installing phase advancing equipment.

     (ii)  By installing extra generating plant. If the
           total cost of generating plant is Rs. 100 per
           kVA, estimate the limiting cost per kVA of
           phase advancing equipment to make its
           use more economical than the additional
           generating plant. Interest and depreciation
           charges may be assumed 10% in each case.

**4**  Attempt any **two** parts of the following :      **10x2=20**

(a)  Explain base load and peak load stations. In an
     interconnected hydro electric and steam stations,
     which is used as base load and which is used
     as peak load stations and why? Run-off river
     plant, nuclear plant, hydroplant with storage,
     steam plant and hydroplant with limited storage
     are connected in the system. Show with the help
     of a diagram how load allocation may be done.

(b)  Derive an expression for the synchronising power
     of two alternators operating in parallel in terms
     of their emf (E), synchronous reactance (Xs) and
     electrical angle of displacement ($\theta$). Neglect the
     winding resistances and assume that alternators
     are not supplying any load.

(c)  A two bus system, without generator limits, have
     been considered as shown in **Fig. 1** where
     $P_{DA} = 400$ MW and $P_{DB} = 100$ MW

Ploss = $0.0008 \ (P_gB - 100)^2$ MW

$(IFC)_A = 0.006 \ P_{gA} + 4.0$ unit/MW hr.

$(IFC)_B = 0.007 \ P_{gB} + 4.0$ unit/Mw hr.

Find optional generaion for each plant and the power loss in the line.
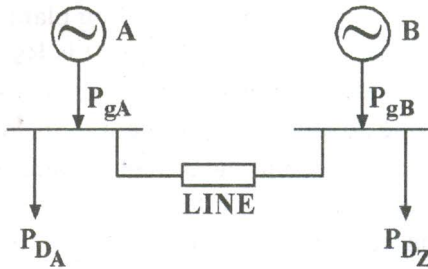


**Fig. 1**

5   Attempt any **four** parts of the following :      **5x4=2(**

   (a)   Discuss the role of private sectors in energy management.

   (b)   Explain the working principle of MHD generation.

   (c)   Discuss the future prospects of solar energy use.

   (d)   Explain the operation of wind power generation in an isolated power system.

   (e)   What is geothermal energy? Discuss the difficulties in extracting geothermal energy.

   (f)   Discuss a tidal power scheme in brief.