FACULTY OF ENGINEERING
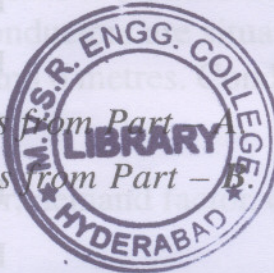## B.E. 3/4 (E & EE) I Semester (Main) Examination, December 2010
POWER SYSTEMS – 1

Time : 3 Hours]   [Max. Marks : 75

Note :   Answer **all** questions from Part – A
              Answer **five** questions from Part – B.

PART – A   (25 Marks)

1. List out merits and demerits of hydro power plants.   3

2. How will you improve the diversity factor of a power station ?   2

3. Write the components of a steam power plant.   3

4. Write the various methods of improving string efficiency.   3

5. Merits and demerits of under ground Transmission system.   3

6. The criterion for selection of size of conductor for a feeder.   1

   a) Voltage drop   b) Corona Drop

   c) Temperature rise   d) Radio interference

7. i) In a single fed distributor if the fault occurs on any section, the supply to all
      consumers has to be shut off.   1
      a) True   b) False

   ii) The insulation of modern EHV lines is designed based on :
      a) Lightning voltage
      b) Switching voltage
      c) Corona
      d) All of the above

8. Match the following :

A	B
Thermal plants	Peak load
Strain insulators	Base load
Bundled conductors	Vertical plane
Hudro Plants	Reduce capacitance
	Reduce reactance

9. Derive the formula for power in (Kw) in Hydro power plant.   3

10. By which law the economic size of the conductor is determined and explain.   3

PART – B   (5×10=50 Marks)

11. a) Draw the schematic diagram of thermal power station and write the function of each component.   6

   b) How can hydro plants be classified according to
      i) Water flow regulation   ii) Head   iii) Load   4

12. a) What considerations have to be kept in view in siting nuclear plants ?   5

   b) How can solar energy be converted into electrical energy ? Give a diagram showing the elements of such a plant.   5

13. a) Derive an approximate expression for sag in over head lines when supports are at equal levels.   5

   b) An insulator string consists of three units, each having a safe working voltage of 15 KV. The ratio of self capacitance to shunt capacitance of each unit is 8 : 1. Find the maximum safe working voltage of the string. Also find the string efficiency.   5

14. a) Derive the inductance per phase of a 3-phase Transmission line with complete transposition cycle. 5

   b) Determine the inductance per KM of 3-phase transmission line using 20 mm diameter conductors when conductors are situated at the corners of the triangle with spacing of 4, 5 and 6 metres. Conductors are regularly transposed. 5

15. a) Define the terms : Load factor, demand factor, diversity factor, base load and peak load. 4

   b) A power station has an installed capacity of 20 MW. The capital cost of station is Rs. 800/KW. The fixed cost is 13% of the cost of investment. On full load at 100% load factor the variable cost of the station per year is 1.5 times the fixed cost. Assume no reserve capacity and variable cost to be proportional to the energy produced, find the cost of generation per KWh at load factor of 100% and 20%. Comment on its results. 6

16. a) Discuss the advantages and disadvantages of
   i) Pin-type insulators ii) Suspension type insulators. 5

   b) Derive an expression for the loop inductances of a single phase line. 5

17. a) Draw the schematic diagram of a nuclear power plant and discuss its operation. 5

   b) Write short notes on fuel cells. 5