Total No. of printed pages = 4

CAI-502/GT&DP/5th Sem/2014/N

GENERATION, TRANSMISSION AND DISTRIBUTION OF POWER

Full Marks – 70

Pass Marks – 28

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer any *five* questions.

1. (a) What do you mean by water hammer effect in hydroelectric power plant ? 4

   (b) How hydro plants are classified according to the availability of head ? 3

   (c) Draw a top view of hydro plant and write three disadvantages of hydro plant. 5

   (d) What are the principal types of water turbines used in hydroelectric plants ? 2

2. (a) What are the points should be taken into account while selecting the site of a thermal plant ? 9

[Turn over

(b) A 100 MW steam station uses coal of calorific value 6400 kcal/kg. Thermal efficiency of the station is 30% and electrical efficiency is 92%. Calculate the coal consumption per hour when the station is delivering its full rated output. 5

3. (a) What is the source of heat in nuclear power station ? 1

(b) What do you mean by mass defect in nuclear reaction ? 1

(c) What is the purpose of moderator in nuclear reactor ? 1

(d) What is the function of control rods in nuclear reactors ? 2

(e) Calculate the fission rate of U^{235} required to produce 2 watts and the amount of energy that is released in the complete fission of 0.5 kg of U^{235}. The energy released per fission of U^{235} is 200 Mev. 9

4. (a) Define voltage regulation and transmission efficiency. Derive an expression for % transmission efficiency for short transmission lines. 6

(b) An 11 kV, 3-ϕ transmission line has a resistance of 1.5Ω and reactance of 4Ω per phase. Calculate the percentage regulation and efficiency of the line when a total load of 5000 KVA at 0.8 lagging power factor is supplied at 11 kV at the distance end. 8

5. (a) In electric power generating stations, why the generated voltage is stepped up ? With the help of a neat diagram, discuss how electric power is transmitted and distributed at the consumer's end. 2+10=12

(b) Write the name of two insulators used in overhead transmission lines. 2

6. (a) Compare the volume of conductor material required for 3-ϕ , 4-wire AC system with DC two wire system with one conductor earthed. 6

(b) What do you mean by distribution system ? With the help of a neat diagram, discuss the primary and secondary AC distribution system. 8

7. Write short notes on any *two* : 7×2=14

(a) Nuclear fission and fusion

(b) Diesel power station

(c) Overhead versus underground system.