Power Generation and Economics VTU CBCS Question Paper Set 2018

CBCS Scheme

USN | | | | | | | | | | |

15EE42

Fourth Semester B.E. Degree Examination, Dec.2017/Jan. 2018
Power Generation and Economics

Time: 3 hrs. Max. Marks: 80

Note: *1.* **Answer any FIVE full questions, choosing ONE full question from each module.**
2. Missing data, if any, may be suitably assumed.

Module-1

1 a. With a neat schematic diagram explain the working hydro-electric power plant. **(06 Marks)**
b. Explain hydrograph and hydrological cycle. **(06 Marks)**
c. Mention the merits and demerits of hydroelectric power plant. **(04 Marks)**

OR

2 a. What are the types of turbines? With a neat diagram explain the working of reaction turbine. **(06 Marks)**
b. With a neat diagram explain the working of turbine governing. **(06 Marks)**
c. Mention the factors to be consider for the selection of site for hydro-electric power plant. **(04 Marks)**

Module-2

3 a. With a schematic diagram (layout) explain the working of steam power plant. **(06 Marks)**
b. Explain any three methods used for the disposal of ash in steam power plant. **(06 Marks)**
c. Mention the advantages and disadvantages of diesel power plant. **(04 Marks)**

OR

4 a. Explain how the use of regemerator, and reheater in gas turbine plants help in improvement in thermal efficiency. **(08 Marks)**
b. Describe the auxilliary equipment of diesel engine power plant. **(08 Marks)**

Module-3

5 a. With a neat diagram explain the working of main parts of nuclear reactor. **(08 Marks)**
b. What are the classification of nuclear reactors? Explain the operation of fast breeder reactor. **(08 Marks)**

OR

6 a. Explain the various methods of nuclear waste disposal. **(06 Marks)**
b. Mention the advantages and disadvantages of nuclear power plant. **(06 Marks)**
c. Mention the factors to be considered for the selection of site for nuclear power plant. **(04 Marks)**

Module-4

7 a. What is a protective relay? Explain its function in an electrical system. **(06 Marks)**
b. With a neat diagram explain the working of HRC (High Rupturing Capacity) fuse. **(06 Marks)**
c. Explain the working of rod gap arrester. **(04 Marks)**

OR

8 a. Draw the line diagram of 66/11 kV sub –station. **(06 Marks)**

b. With a neat sketch, explain ungrounded system in power system. **(06 Marks)**

c. Mention the advantages of neutral – grounding. **(04 Marks)**

Module-5

9 a. Define the following terms as applied to power system :

i) Load factor

ii) Demand factor

iii) Diversity factor

iv) Plant capacity factor. **(08 Marks)**

b. A power station is to supply three region of load whose peak loads are 20MW, 15MW and 25MW. The annual load factor is 50% and the diversity factor of the load at the station is 1.5. Determine the following :

i) Maximum demand on the station

ii) Installed capacity suggesting number of units

iii) Annual energy supplied. **(08 Marks)**

OR

10 a. What is power factor? Explain any one method of improving power factor. **(06 Marks)**

b. A power station has to supply load as follows.

Time (hours)	0 – 6	6 – 12	12 – 14	14 – 18	18 – 24
Load (MW)	30	90	60	100	50

i) Draw the load curve

ii) Draw load – duration curve

iii) Calculate the load factor. **(06 Marks)**

c. Define tariff. Explain :

i) Block rate tariff

ii) Two – part tariff. **(04 Marks)**

* * * * *

CBCS Scheme

USN 15EE42

Fourth Semester B.E. Degree Examination, June/July 2017
Power Generation and Economics

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Define : i) hydrograph ii) flow duration curve and mass curve. **(06 Marks)**
b. Explain the factors to be considered for selection of site for hydro-electric power plant. **(05 Marks)**
c. Give the classification of hydro power plant. **(05 Marks)**

OR

2 a. Explain the essential elements of hydro power plant with neat schematic diagram. **(06 Marks)**
b. Explain the governing mechanism of hydraulic impulse turbine and reaction turbine with neat sketches. **(06 Marks)**
c. Discuss the merits and demerits of hydro power plant. **(04 Marks)**

Module-2

3 a. Explain the working of steam power plant with neat schematic diagram. **(06 Marks)**
b. Explain the techniques of dust collection in thermal power station. **(06 Marks)**
c. Explain the function of air-preheater and economizer in thermal plant. **(04 Marks)**

OR

4 a. Mention the application of diesel electric power plant. **(05 Marks)**
b. With neat sketch, explain the working of a gas turbine plant. **(06 Marks)**
c. Give the comparison of hydro power plant with stream power plant. **(05 Marks)**

Module-3

5 a. Explain the nuclear reactor with neat diagram. **(06 Marks)**
b. List the advantages and disadvantages of nuclear power plant. **(05 Marks)**
c. Describe construction and working of a pressurized water reactor. **(05 Marks)**

OR

6 a. Explain the working operation of nuclear power plant with neat sketch. **(06 Marks)**
b. Give the various classifications of nuclear reactor and explain anyone. **(04 Marks)**
c. Explain the function of moderator, control rod, coolant in nuclear power plant. **(06 Marks)**

Module-4

7 a. Explain resonant grounding with a neat diagram. **(06 Marks)**

b. Explain the function of transformer, high voltage circuit breaker and high voltage insulator in substation. **(06 Marks)**

c. Draw a neat single diagram of substation and explain it. **(04 Marks)**

OR

8 a. Define substation and mention different types of substations. **(06 Marks)**

b. A 230V, 3φ, 50Hz, 200 km transmission has a capacitance to earth of 0.01mF/km per phase. Calculate the inductance and KVA rating of Peterson coil used for earthling the above system. **(05 Marks)**

c. Explain double bus without sectionlisation. **(05 Marks)**

Module-5

9 a. Define the following terms :
i) Load factor ii) diversity factor iii) plant use factor. **(06 Marks)**

b. A generating station has 3 × 50 MW units. The station output is 876×10^6 KWH per annum. The maximum demand is 120 MW calculate : **(06 Marks)**
i) average load on the station
ii) annual load factor
iii) annual capacity factor.

c. Explain the factors affecting tariff. **(04 Marks)**

OR

10 a. Explain : i) two part tariff ii) power factor tariff iii) maximum demand tariff. **(06 Marks)**

b. Discuss various methods of power factor improvement. **(04 Marks)**

c. Calculate the annual energy cost of an industrial consumer who takes a load of 20 KW for 1 hour per day, 150 KW for 7 hours per day and 50 KW for 8 hours/day. The tariff in force is Rs. 20 per kilowatt of maximum demand and 10 paise per KWH. Assume 6 working days in a week. **(06 Marks)**

* * * * *