VTU B.E/B.TECH QUESTION PAPER SET

CBCS
SEMESTER IV

POWER GENERATION AND ECONOMICS

Use bookmarks to easily navigate between question papers

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)**

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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)**

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15EE42

Fourth Semester B.E. Degree Examination, June/July 2018
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. What is hydrological cycle? **(02 Marks)**

b. Describe the merits and demerits of hydroelectric power –plants. **(08 Marks)**

c. What are the characteristics of a water turbine? **(06 Marks)**

OR

2 a. What is meant by the phenomenon 'water hammer? Explain how a surge tank helps in reducing water hammer effect. **(05 Marks)**

b. Explain working of pumped shortage power plant, stating its advantages with the help of a schematic diagram. **(08 Marks)**

c. Define impulse and reaction type of turbines. **(03 Marks)**

Module-2

3 a. What are the main considerations for selection of site for a thermal power station? **(08 Marks)**

b. Explain briefly the functions of : i) Reheaters ii) Condensers. **(06 Marks)**

c. What do you understand by fluidized bed combustion? **(02 Marks)**

OR

4 a. Explain the filed of applications of diesel power plants. **(08 Marks)**

b. Describe the working of closed cycle gas turbine power-plant with a schematic diagram. **(08 Marks)**

Module-3

5 a. Describe the operation of nuclear power plant with the help of a block diagram showing basic components. **(07 Marks)**

b. Describe fast breeder reactors, stating its advantages. **(07 Marks)**

c. What is nuclear fission? **(02 Marks)**

OR

6 a. With a neat diagram, explain main parts and their function of a nuclear reactor. **(08 Marks)**

b. Explain with respect to a nuclear plant : i) Nuclear waste disposal ii) Shielding. **(06 Marks)**

c. What is meant by radio activity? **(02 Marks)**

Module-4

7 a. What are the functions of a sub-station? **(06 Marks)**

b. List out the advantages and disadvantages of outdoor substation over indoor substation. **(06 Marks)**

c. What do you understand by : i) switch gear ii) protective relay. **(04 Marks)**

OR

8 a. Explain : i) resistance grounding and ii) reactance grounding, stating where they are employed. **(06 Marks)**

b. State the functions of : i) current limiting reactor ii) lighting arrester iii) fuse. **(06 Marks)**

c. Give the classification of sub–stations. **(04 Marks)**

Module-5

9 a. Describe the classification of cost of electricity. **(06 Marks)**

b. What are the factors to be considered while deciding the number of generating units? **(06 Marks)**

c. Define : i) cold reserve ii) hot reserve iii) operating reserve iv) spinning reserve. **(04 Marks)**

OR

10 a. Define : i) demand factor ii) diversity factor. **(04 Marks)**

b. Describe types of consumers and their tariffs. **(06 Marks)**

c. Explain the disadvantages of low power factor. **(06 Marks)**

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CBCS SCHEME

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

17EE42

Fourth Semester B.E. Degree Examination, June/July 2019
Power Generation and Economics

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Discuss the utility of hydrograph, flow duration curve and mass curve for the power plants. **(06 Marks)**

b. Explain with neat sketch the working of hydroelectric power plant station and explain the function of each component in it. **(10 Marks)**

c. Describe different turbines and their use in hydroelectric plants. **(04 Marks)**

OR

2 a. What are the main considerations for selection of site for a hydroelectric power station? **(06 Marks)**

b. Explain the governing mechanism of water turbine, with neat sketch. **(06 Marks)**

c. How the Hydro plants are classified? Explain in detail. **(08 Marks)**

Module-2

3 a. A thermal station has an overall efficiency of 21% and 0.75 kg of coal is burnt per kWh of generated energy. Determine the calorific value of coal. **(04 Marks)**

b. Draw the schematic diagram of modern steam power station and explain its operation with its important components. **(10 Marks)**

c. Write short notes on :
(i) Electrostatic precipitator
(ii) Underfeed stokers. **(06 Marks)**

OR

4 a. Discuss in brief the methods of improving thermal efficiency of gas turbine power plants. **(09 Marks)**

b. Discuss the advantages and disadvantages of a diesel power plant. **(04 Marks)**

c. Draw a layout of Diesel power plant. Showing the various systems, including cooling, lubrication, starting, intake and exhaust systems. **(07 Marks)**

Module-3

5 a. Explain with a neat diagram various parts of a nuclear reactor, explain clearly the each part. **(06 Marks)**

b. Mention the factors to be considered for the selection of site for nuclear power plant. **(06 Marks)**

c. Describe construction and working of a pressurized water reactor. **(08 Marks)**

OR

6 a. With examples, explain the difference between a fissible material and a fertile material. **(04 Marks)**

b. Describe the different types of fuels used in a Nuclear power plant and discuss the problem of nuclear waste disposal. **(08 Marks)**

c. Explain the function of moderator, coolant, control rod and shielding in nuclear power plant. **(08 Marks)**

Module-4

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

b. Define substation and mention different types of substation. **(06 Marks)**

c. Explain resonant grounding and resistance grounding with a neat diagram. **(08 Marks)**

OR

8 a. Explain single bus-bar with bus sectionalizer. **(06 Marks)**

b. Explain Gas Insulated substation and mention its advantages. **(08 Marks)**

c. Explain Earthing Transformer with neat diagram. **(06 Marks)**

Module-5

9 a. Define Tariff. Explain (i) Block Rate Tariff (ii) Two Port Tariff (iii) KVA Maximum demand Tariff. **(06 Marks)**

b. Explain methods of determination of depreciation. **(09 Marks)**

c. Write a short notes on Classification of costs. **(05 Marks)**

OR

10 a. State the causes and effects of a poor power factor. Also explain methods of power factor improvement. **(10 Marks)**

b. 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 (Maximum demand = 220 kW) and 10 paise per KWH. Assume 6 working days in a week. **(06 Marks)**

c. Explain concept of load sharing and choice of size and number of generating plants. **(04 Marks)**

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