

Code No: RT22024

R13**SET - 1****II B. Tech II Semester Regular Examinations, April/May – 2016****POWER SYSTEMS - I**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**
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PART -A

1. a) Define the function of Economizer? (4M)
- b) What is meant by chain reaction? (4M)
- c) Define the design features of distribution systems? (4M)
- d) What are the Advantages of Gas insulated substations? (3M)
- e) Define the Capacitance grading? (3M)
- f) Define (i) Maximum demand and (ii) Demand factor. (4M)

PART -B

2. a) Explain the function of Boilers and Super heaters in thermal power plants? (8M)
- b) Explain the factors to be considered for the selection of the site for a thermal power station? (8M)
3. a) Explain the classification of nuclear reactor and briefly discuss about each one. (8M)
- b) Explain about the pressurized water reactor with neat sketch? (8M)
4. a) Explain about the different types of distribution systems. (8M)
- b) List out the Comparisons between AC and DC distribution systems. (8M)
5. a) Explain about the 33/11 kV substation showing the location of all the substation equipments. (8M)
- b) Explain the merits and demerits of indoor substations over outdoor substations. (8M)
6. a) Explain classification of cables and discuss their general construction with neat sketch. (8M)
- b) Explain the purpose of using inter sheaths in a cable. (8M)
7. a) Define the following with respect to the economic aspects of power generation. (8M)
i) Connected load ii) Load factor iii) Plant capacity factor
- b) Calculate the generating cost per kWh, delivered from a generating station (8M)
from the following data. Plant capacity 500 MW; annual load factor 45 %;
capital cost Rs.1200×10⁶; annual cost of fuel etc Rs.160 × 10⁶, interest 9.2 %
per annum of initial value.

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R13**SET - 2****II B. Tech II Semester Regular Examinations, April/May – 2016****POWER SYSTEMS - I**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

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 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**
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PART -A

1. a) Define the function of super heaters? (3M)
- b) What is the function of Control rods? (3M)
- c) Draw the line diagram of radial DC distributor fed at one end with equal loads? (4M)
- d) What are the merits and demerits of the double bus bar with one circuit breaker? (4M)
- e) What is the need of the Inter sheath grading? (4M)
- f) Define the (i) Simple rate (ii) Flat Rate and (iii) Block-Rate. (4M)

PART -B

2. a) Explain the functions of Cooling tower and condenser with respect to a thermal power station. (8M)
- b) What is feed water? What are the problems associated due to impurities in feed water? How they can be eliminated. (8M)
3. a) Describe the Boiling water reactor (PWR) with neat diagram. (8M)
- b) Explain the methods of producing nuclear reaction? What is chain reaction? (8M)
4. a) List the advantages of ring mains system of distribution over the radial system. (8M)
- b) A DC ring main ABCDA is fed from point A with 230 V supply and the loop resistances of various sections are AB = 0.04 ohms; BC = 0.35 ohms; CD = 0.5 ohms and DA = 0.05 ohms. The main supplies 100 A at B, 150A at C and 200 A at D. Calculate the voltages at each load point. If the points A and C are inter connected through a link of 0.05 ohm. (8M)
5. a) Explain in detail about the distribution feeder fed from both ends with equal voltages and derive the expressions for voltage drop of each section. (8M)
- b) Explain with a neat lay out diagram of a single bus bar arrangement and list its merits and demerits. (8M)
6. a) A single core cable has a conductor diameter of 2.5 cm and a sheath of inside diameter 6cm. Calculate the maximum stress. It is desired to reduce the maximum stress by using two inters heaths. Determine their best position, the maximum stress and the voltage on each. Consider the System voltage as 3-phase 66 kV. (8M)
- b) Explain about the different insulating materials in detail. (8M)
7. a) Explain Two-part tariff and compare it with power factor tariff. (8M)
- b) A generating station has a maximum demand of 500 MW. The annual load factor is 50 and capacity factor is 40 %. Find the reserve capacity of the plant. (8M)

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R13**SET - 3****II B. Tech II Semester Regular Examinations, April/May – 2016****POWER SYSTEMS - I**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**
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PART -A

1. a) Write function of electrostatic precipitators. (4M)
- b) Define the principle of nuclear fission. (4M)
- c) Draw the line diagram of radial distribution system. (4M)
- d) What are the limitations of Indoor substation? (3M)
- e) What is the capacitance grading of the cable. (3M)
- f) Define (i) Load factor and (ii) Diversity factor. (4M)

PART -B

2. a) Explain with a neat lay out diagram with main parts and the working of a steam power station. (8M)
- b) What are the limitations of a thermal power plant? (8M)
3. a) Explain the Basic components of a Nuclear reactor with a neat diagram. (8M)
- b) List the advantages and disadvantages of a Fast breeder reactor (FBR). (8M)
4. a) What is an inter connector? Discuss its advantages in a distribution system. (8M)
- b) Explain about the stepped distributor with neat diagram. (8M)
5. a) Explain the factors to be considered when selecting a location for a substation. (8M)
- b) What are the factors to be considered for selecting bus bars? (8M)
6. a) Show that in a 3-core (belted type) cable the neutral capacitance of each conductor C_n is equal to $C_s + 3C_c$, where C_s and C_c are the capacitances of each conductor to sheath and to each other respectively. And further explain how these capacitances can be measured experimentally. (8M)
- b) Explain about capacitance grading of the cable in detail. (8M)
7. a) Define the following with respect to the economic aspects of power generation (8M)
 - i) Load duration curve, ii) Demand factor, iii) Diversity factor and
 - iv) Maximum demand
- b) Explain the terms load factor and diversity factor and discuss their effect on the cost of generation of electrical energy. (8M)

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R13**SET - 4****II B. Tech II Semester Regular Examinations, April/May – 2016****POWER SYSTEMS - I**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**
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PART -A

1. a) What is the need of condenser in thermal plants (4M)
- b) Write Short notes on Radiation hazards and shielding in nuclear power stations. (4M)
- c) Describe the design features of distribution systems? (4M)
- d) Draw the line diagram of Air insulated substation. (3M)
- e) Derive the expressions for P.f of cable (3M)
- f) What is the significance of load factor and diversity factor? (4M)

PART -B

2. a) Explain about the Different types of Boilers in details with neat sketch. (8M)
- b) Explain about the classifications of pulverizing mills. (8M)
3. a) Write short notes on Reflectors and Coolants in nuclear reactors. (8M)
- b) Explain the structure of an atom. What is the difference between atomic number and mass number and also mention their relevance in nuclear reaction. (8M)
4. a) Find the power loss equation for DC distributor fed at one end-uniformly loading system. (8M)
- b) Explain about the comparisons between comparison of DC and AC distribution. (8M)
5. a) Explain about main and transfer bus bar system with relevant diagrams. (8M)
- b) List the advantages and disadvantages of Gas-insulated substation. (8M)
6. a) Explain about the Grading of cables in detail. (8M)
- b) Find the most economical diameter of a single core cable to be used on a 132 kV, 3-phase system. Find also the overall diameter of the insulation if the peak permissible stress is not to exceed 60 kV per cm. (8M)
7. a) A consumer has a maximum demand of 200KW, maintain 1 load factor of 40%.The tariff rates are Rs 100 per KW of maximum demand plus 10 paisa per Kwh, Find (i) total energy consumed per annum (ii) The annual electricity bill. (8M)
- b) Define the following terms (i) Flat rate tariff, (ii) Maximum demand, (iii) Average load and (iv) Simple tariff. (8M)