Code No: R1622025 **R16** SET - 1

II B. Tech II Semester Regular/ Supplementary Examinations, April/May - 2019
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 **FOUR** Questions from **Part-B**

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PART –A

1. a) Describe ID Fan in thermal power stations. (2M)
   b) Write the points to be consider for location of nuclear power plants. (2M)
   c) Write the Features of DC Distribution systems. (2M)
   d) Draw the diagram for single bus bar arrangement. (2M)
   e) Describe grading of cables. (3M)
   f) Define the following terms in connection with power supply systems: (3M)
      (i) Connected load (ii) maximum demand
      (iii) Demand factor and (iv) load factor.

PART -B

2. a) Draw the schematic arrangement of a thermal power station and explain the function of each briefly. (7M)
   b) Explain the functions of Economizer and superheater in a thermal power plant with neat diagrams. (7M)

3. a) What is a Nuclear Reactor? Explain the basic components of Nuclear Reactor. (7M)
   b) Describe working of PWR (pressurized water reactor). What are its advantages and disadvantages? (7M)

4. a) Derive an expression for the power loss in a uniformly loaded distributor fed at one end. (7M)
   b) A 2 wire DC distributor cable PQ 1.5km long have a total resistance of $0.15\,\Omega$. The ends P and Q are fed at 230 V. The cable is uniformly loaded at 1 A/m length and concentrated loads of 100 A, 75 A, 125 A and 30 A at points distant of 300m,500m,800m and 1200m respectively from the end P. Determine the following: (7M)
      i) The point of minimum potential
      ii) Currents supplied from ends P & Q

5. a) What are the advantages and disadvantages of outdoor substation as compared to indoor substation? (7M)
   b) Explain in detail about constructional aspects of gas insulated substation. (7M)

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6. a) Derive the expression for the capacitance of a single core cable per km. (7M)
   b) Derive an expression for the insulation resistance of a single core metal sheathed cable. (7M)

7. a) Explain procedural steps to draw load duration curve and write the importance of load duration curve. (7M)
   b) What are the factors influencing tariff design and explain the various types of tariffs in detail. (7M)

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Code No: R1622025 **R16** SET - 2

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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 **FOUR** Questions from **Part-B**

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PART –A

1. a) Explain different types of boilers in thermal power plants. (2M)
   b) Define nuclear chain reaction. (2M)
   c) Explain ring main DC distribution systems. (2M)
   d) Write Advantages of Gas insulated substations. (2M)
   e) How cables are classified and Write application of each type of cable. (3M)
   f) Write the uses with integrated load duration curve. (3M)

PART -B

2. a) Describe the flue gasses path of the thermal stations with schematic arrangement. (7M)
   b) What are the functions of Air preheater and condensar in a thermal power plant? (7M)

3. a) Name the different nuclear materials. Explain each of them with examples. (7M)
   b) Explain the functions of moderator and control roads in nuclear power plants. (7M)

4. a) Explain different types of distribution systems with the help of neat sketches. (7M)
   b) A two wire distributor is loaded as shown in figure 4. The voltage at the two ends is 230V and 230V respectively. The distance between sections are given in meters. Determine the cross section of the conductor for a minimum consumer's voltage of 220V. (7M)

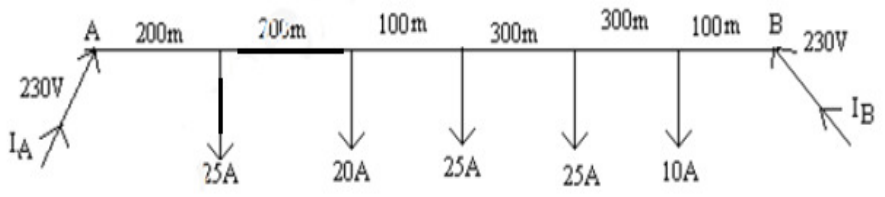

Figure 4

5. a) Explain the main and transfer bus bar system with circuit diagram. (7M)
   b) Draw and explain the layout of 33 KV / 11 KV substation. (7M)

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6. a) Derive the formula for insulation resistance of a cable. (7M)

   b) A single core cable has an inner diameter of 5 cm and core diameter of 2.0.cm. Its paper dielectric has maximum working dielectric stress of 55 kV/cm. Calculate the maximum permissible line voltage when such cables are used for 3-phase power system. (7M)

7. a) A generating station supplied the following loads: 175MW, 100MW, 80MW, 50MW and 4 MW. The station has a maximum demand of 225MW. The annual load factor of the station is 45%, Calculate (i) the number of units supplied annually (ii) the diversity factor and (iii) the demand factor. (7M)

   b) Briefly explain the fixed cost, semi-fixed cost and running cost. (7M)

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Code No: R1622025 **R16** SET - 3

II B. Tech II Semester Regular/ Supplementary Examinations, April/May - 2019
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 **FOUR** Questions from **Part-B**

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PART –A

1. a) Describe economizser in thermal power plamts. (2M)
   b) Explain working principle of nuclear power plant. (2M)
   c) Explain radial distribution system with diagram. (2M)
   d) Write the classification of sub-stations. (2M)
   e) Explain grading of a cable. (3M)
   f) Define the diversity factor and write its importance. (3M)

PART -B

2. a) Write the points to be consider for selection of site for thermal plants. (7M)
   b) Explain briefly feed water circuit, Cooling towers and Chimney in thermal power plants. (7M)

3. a) What are the functions of moderator and control rods in a nuclear power plants. (7M)
   b) Distinguish between thermal and fast reactors. Classify each according to moderator, coolant and fuel utilized. (7M)

4. a) Discuss briefly the design considerations in distribution system. (7M)
   b) A DC 2 wire distributor 600m long is fed at both ends A and B at 220V shown in figure 4. The load consists of 50A at 100m from A, 75A at 150m from A and a uniform loading of 0.5A per meter for the last 400m. The resistance of each conductor is 0.05/Km. Determine the location and magnitude of minimum voltage. (7M)

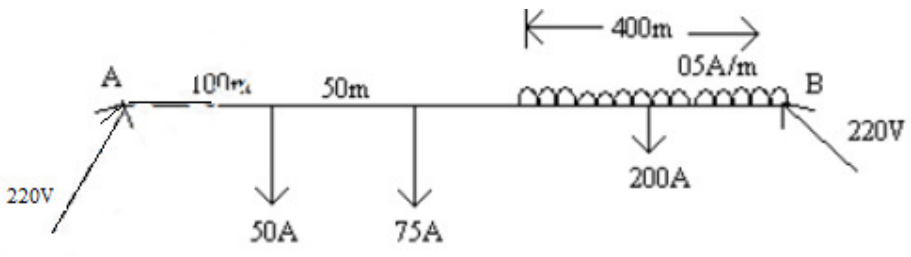

Figure 4

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5. a) With suitable diagrams explain the main and transfer bus arrangement. (7M)
   b) Write Comparison of Air insulated substations and Gas insulated substations. (7M)

6. a) A cable has been insulated with two insulating materials having permitivity of 6 and 4 respectively. The inner and outer diameter of a cable is 3 cms and 7 cms. If the dielectric stress is 50 kV/cm and 30 kV/cm, Calculate the radial thickness of each insulating layer and the safe working voltage of the cable. (7M)
   b) Derive expressions for capacitance of a three core belted cable. (7M)

7. a) Explain the terms load factor and diversity factor. How do these factors influence the cost of generation? (7M)
   b) Explain two-part, three–part and power factor tariff methods. (7M)

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Code No: R1622025 **R16** SET - 4

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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 **FOUR** Questions from **Part-B**

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PART –A

1.	a)	Briefly describe super heater in thermal power plants.	(2M)
	b)	Describe Radiation hazards and Shielding in nuclear power plants.	(2M)
	c)	Briefly Classify Distribution systems.	(2M)
	d)	Draw single line diagram of gas insulated substations.	(2M)
	e)	Describe construction of cable.	(3M)
	f)	Describe different costs of generation.	(3M)

PART -B

2.	a)	Draw a typical layout of a thermal power plant and describe the function of the following components. (i) Flue gases circuit (ii) feed water circuit (iii) Boiler.	(7M)
	b)	Explain different types of turbines used in thermal power plants.	(7M)
3.	a)	Explain the Fusion and Fission reaction in detail.	(7M)
	b)	Discuss the boiling water reactor, mentioning its merits and demerits.	(7M)
4.	a)	A 2-wire DC ring distributor is 300m long and is fed at 240V at point A. At point B, 150m from A, a load of 120A is taken and at C, 100m in the opposite direction, a load of 80a is taken if the resistance per 100m of single conductor is 0.03, find i) current in each section of distributor ii) voltage at points B and C.	(7M)
	b)	Write the comparison between AC distribution system and DC distribution systems.	(7M)
5.	a)	Explain the following with circuit diagrams. (i) Single bus bar arrangement with sectionalization. (ii) Main and transformer bus bar arrangements.	(7M)
	b)	Explain in detail about constructional aspects of gas insulated substation.	(7M)

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6. a) Derive the expression for the capacitance of a single core cable per km. (7M)

   b) Explain different methods for grading of cables. (7M)

7. a) Explain the terms load factor and diversity factor. How do these factors influence the cost of generation? (7M)

   b) Explain briefly the following types of tariff in electrical system. (7M)
   i) two part tariff
   ii) power factor tariff
   iii) Block rate part tariff

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