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

II B. Tech II Semester Regular Examinations, April - 2018
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)	What are the factors to be considered for selecting the site of a thermal power station?	(3M)
	b)	What is the importance of reflector in nuclear reactor?	(3M)
	c)	Give the comparison between DC and AC distribution systems	(2M)
	d)	What are the Advantages of Gas insulated substations	(2M)
	e)	What are the types of cables?	(2M)
	f)	Define load factor and demand factor.	(2M)

PART -B

2.		Draw the general layout of the thermal power station and discuss each component in detail.	(14M)
3.	a)	Discuss about the nuclear waste disposal mechanism in a nuclear power plant.	(7M)
	b)	Explain essential components of a nuclear reactor.	(7M)
4.	a)	A two-wire DC distributor cable 1000mts long is loaded with 0.5A/ meter. Resistance of each conductor is 0.05Ω /Km. Calculate the maximum voltage drop, if the distributor is fed from both ends with equal voltages of 220V. What is the minimum voltage and where it occurs.	(7M)
	b)	What are the advantages of doubly fed distributor over singly fed distributor?	(7M)
5.	a)	What is the difference between indoor and outdoor substations? What are the factors which are to be considered for a selection of a site of a substation?	(7M)
	b)	Draw the single line diagram of a GIS and explain.	(7M)
6.	a)	Derive the equation for calculating the insulation resistance of a single core cable.	(7M)
	b)	The insulation resistance of a single core cable is 495MΩ/Km. If the core diameter is 2.5cm and resistivity of insulation is 4.5 X 10^{14}Ω-cm. Find the insulation thickness.	(7M)
7.	a)	Discuss the objectives and requirements of tariff methods.	(7M)
	b)	Calculate annual bill of a consumer whose maximum demand is 100KW, p.f=0.8 lagging and load factor=60%. The tariff used is Rs.75/KVA of maximum demand plus 15 paise per KWh consumed.	(7M)
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Code No: R1622025 **R16** SET - 2

II B. Tech II Semester Regular Examinations, April - 2018
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)	Write the importance of electrostatic precipitator.	(3M)
	b)	What are the factors to be considered while selecting the site for a nuclear power plant?	(2M)
	c)	What are the characteristics of ring main distribution system	(3M)
	d)	Give the comparison of outdoor and indoor substations	(2M)
	e)	What is meant by capacitance grading?	(2M)
	f)	Define diversity factor and plant capacity factor.	(2M)

PART -B

2.	a)	Explain the functions of Cooling tower and condenser with respect to a Thermal power station.	(7M)
	b)	Explain impulse and reaction turbines in brief.	(7M)
3.	a)	Explain the radiation hazards and shielding in nuclear power plants.	(7M)
	b)	Write the advantages and disadvantages of a Fast breeder reactor.	(7M)
4.	a)	A 250 m, two-wire DC distributor fed from one end is loaded uniformly at the rate of 0.16A/meter. The resistance of each conductor is 0.0002Ω/meter. Find the voltage necessary at fed point to maintain 250V 1) at the far end 2) at the mid-point of the distributor.	(7M)
	b)	What is the importance of load power factor in AC distribution?	(7M)
5.	a)	Explain with a neat lay out diagram of main and transfer bus bar system.	(7M)
	b)	Explain with a neat lay out diagram of a double bus bar arrangement with two circuit breakers.	(7M)
6.	a)	Derive the expression for capacitance of a single core cable.	(7M)
	b)	Calculate the capacitance and charging current of a single core cable used on a 3-phase, 66KV system. The cable is 1Km long having a core diameter of 10cm and an impregnated paper insulation of thickness 7cm. The relative permittivity of the insulation may be taken as 4 and the supply frequency as 50Hz.	(7M)
7.		Explain various types of tariffs with relative advantages and disadvantages?	(14M)
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Code No: R1622025 **R16** SET - 3

II B. Tech II Semester Regular Examinations, April - 2018
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) What are the functions of an economizer? (2M)
   b) What is chain reaction? (3M)
   c) Draw the single line diagram of radial distribution system (2M)
   d) Draw the single line diagram of Gas insulated substation (3M)
   e) What is meant by inter sheath grading? (2M)
   f) What is meant by three-part tariff? (2M)

PART -B

2. a) Describe the functions of economizer and super heater in a thermal power plant. (7M)
   b) What is feed water? What are the problems associated due to impurities in feed water? How they can be eliminated. (7M)

3. Explain the working of a Nuclear Power Station with a neat layout diagram. (14M)

4. a) Derive an expression for the voltage drop for a uniformly loaded distributor fed at one end. (7M)
   b) A two-wire DC distributor AB is 300m long. The end A is fed at 205V and end B at 200V. The distributor is uniformly loaded at 0.15A/m length and concentrated loads of 50A, 60A and 40A at point distance 75, 175,225 meters respectively from the end A. The resistance of each conductor is 0.15Ω/Km. Calculate i) the point of minimum potential ii) the currents fed at ends A&B. (7M)

5. a) Explain with a neat lay out diagram of a single bus bar arrangement and list its merits and demerits. (7M)
   b) Explain the installation and maintenance of gas insulated substation (7M)

6. a) Derive the expression for electrostatic stress in a single core cable. Where does maximum stress occur and where is it minimum and why? (7M)
   b) 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. (7M)
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7. a) What do you understand by the load curve? What information's are conveyed by a load curve? (7M)
   b) The annual load duration for of a certain power station cab be considered as a straight line from 20MW to 4MW to meet this load, three turbine-generator units, two rated at 10MW each and one rated at 5MW are installed. Determine i) Installed capacity ii) plant factor iii) units generated per annum iv) load factor and v) utilization factor. (7M)

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

II B. Tech II Semester Regular Examinations, April - 2018
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)	Write about condenser of a thermal power station.	(2M)
	b)	How the nuclear power plant effects the environment?	(2M)
	c)	Write the design features of distribution systems.	(3M)
	d)	What are the merits of gas insulated substation over air insulated substation	(2M)
	e)	Write the expression for 3-core belted cable	(3M)
	f)	What is meant by block-rate tariff?	(2M)

PART -B

2.	a)	Explain briefly about ash handling mechanism in a thermal plant.	(7M)
	b)	What are the limitations of a thermal power plant?	(7M)
3.	a)	Write the advantages and disadvantages of Nuclear Power Stations.	(7M)
	b)	With the help of neat diagram, describe the working of pressurized water reactor.	(7M)
4.		Explain, in detail the radial and ring main distribution systems. Discuss the characteristics of each system. Also explain the design features of each system.	(14M)
5.	a)	Explain about the 33/11 kV substation showing the location of all the substation equipments.	(7M)
	b)	What are the various types of bus bar arrangements in the substation?	(7M)
6.	a)	A single core, 33kV cable has a conductor diameter of 3.4 cm and a sheath of inside diameter 6.2 cm. The cable has an inner layer of 1.5 cm thick of rubber of dielectric constant 5.1 and rest impregnated refer of dielectric constant 3.2. Find the maximum stresses in the rubber and in the paper.	(7M)
	b)	Explain the purpose of using inter sheaths in a cable.	(7M)
7.	a)	Write short note on: i) Two-part tariff ii) Power factor tariff	(7M)
	b)	A 2000 MW power station delivers 2000 MW for 3 hours, 600 MW for 7 hours and is shutdown for the rest of each day. It is also shut down for maintenance for 70 days annually. Calculate its annual load factor.	(7M)
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