



NARASIMHAREDDYENGINEERINGCOLLEGE

(Autonomous)

Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad
Accredited by NAAC with A Grade, Accredited by NBA

ELECTRICAL AND ELECTRONICS ENGINEERING

QUESTIONBANK

Course Title :Power System - I

Course Code :EE2201PC

Regulation: NR21

Course Objectives

- To understand the different types of power generating stations.
- To examine A.C. and D.C. distribution systems.
- To understand and compare overhead line insulators and Insulated cables.
- To illustrate the economic aspects of power generation and tariff methods.
- To evaluate the transmission line parameters calculations
- To understand the concept of corona

Course Outcomes (CO's)

CO1 Understand the concepts of power systems.

Co2 Understand the operation of conventional generating stations and renewable sources of electrical power.

CO3 Evaluate the power tariff methods.

CO4 Determine the electrical circuit parameters of transmission lines

CO5 Understand the layout of substation and underground cables and corona.

UNIT-I

Generation of Electric Power Conventional and Non-Conventional Sources

S.No	Questions	BT	CO	PO
Part –A(Short Answer Questions)				
1	What are the common sources of energy?	L1	CO1	PO1
2	What are advantages and disadvantage, of a thermal power plant?	L1	CO1	PO1
3	Name conventional and non conventional sources of energy.	L1	CO1	PO1
4	List the properties of control rods.	L1	CO1	PO1
5	What is a gas turbine plant?	L1	CO1	PO1

6	Write merits and demerits of conventional and non conventional sources of energy	L1	CO1	PO1
7	Mention the materials used as control rods and shield in a nuclear reactor.	L1	CO1	PO1
8	What is the function of combustion chamber in gas turbine power plant?	L1	CO1	PO1
9	Write a short note on super heater.	L1	CO1	PO1
10	What are the main parts of Nuclear reactor and their functions?	L1	CO1	PO1
Part– B(Long Answer Questions)				
11	a) Draw a general layout of a modern thermal power plant and explain each component in detail?	L2	CO1	PO1, PO2
	b) Explain in detail the constructional aspects of a gas turbine plant.	L2	CO1	PO1, PO2
12	a) Draw a general layout of a modern nuclear power plant and explain each component in detail?	L1	CO1	PO1
	b) Explain in detailed about hydro power plant?	L2	CO1	PO1, PO2, PO3
13	a) Explain the working principle of horizontal axis wind turbine?	L2	CO1	PO1, PO2, PO3
	b) Explain in detailed about tidal and ocean power plant?	L2	CO1	PO1, PO2
14	a) Explain in detailed about wave energy and fuel cells?	L2	CO1	PO1, PO2
	b) What are the points to be considered for the selection of site for thermal power plant?	L2	CO1	PO1
15	a) What are the different merits and demerits of nuclear power plant?	L2	CO1	PO1, PO2
	b) What are the points to be considered for the selection of site for hydel power plant?	L1	CO1	PO1

UNIT–II

Economics of Generation

S.No	Questions	BT	CO	PO
Part –A(Short Answer Questions)				
1	What is the importance of load power factors in a.c. distribution?	L1	CO2	PO1
2	Why is tariff for power load less than the lighting load?	L1	CO2	PO1
3	The values of demand factor and load factor are always less than one. Why?	L1	CO2	PO1
4	Define annual plant capacity factor	L1	CO2	PO1
5	Mention the types of tariffs are used for domestic and commercial consumer?	L1	CO2	PO1
6	Define Load curve and load duration curve	L1	CO2	PO1
7	What is meant by Two Part Tariff?	L1	CO2	PO1
8	Define maximum demand and load factor	L1	CO2	PO1
9	Define the load curve.	L1	CO2	PO1
10	What are the different types of power factor tariff methods	L1	CO2	PO1
Part– B(Long Answer Questions)				
11	a) What do you understand by the load curve? What information is conveyed by a load curve	L1	CO2	PO1

	b)	Write short notes on the following: i. load factor ii. demand factor iii. diversity factor iv. average load	L2	CO2	PO1, PO2														
12	a)	A generating station has a connected load of 43MW and a maximum demand of 20 MW; the units generated being 61.5×10^6 per annum. Calculate (a) the demand factor and (b) load factor	L2	CO2	PO1														
	b)	the following is the load cycle of a house/day <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>S.NO</th> <th>LOAD</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>1kw (lamp load)</td> <td>6a.m to 8p.m</td> </tr> <tr> <td>2.</td> <td>500w(lamp load)</td> <td>7p.m to 10p.m</td> </tr> <tr> <td>3.</td> <td>500w(fan load)</td> <td>12 noon to 8p.m</td> </tr> <tr> <td>4.</td> <td>2kw(heater load)</td> <td>6a.m to 7a.m & 5p.m to 6p.m</td> </tr> </tbody> </table>	S.NO	LOAD	Time	1.	1kw (lamp load)	6a.m to 8p.m	2.	500w(lamp load)	7p.m to 10p.m	3.	500w(fan load)	12 noon to 8p.m	4.	2kw(heater load)	6a.m to 7a.m & 5p.m to 6p.m	L2	CO2
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13	a)	Write short notes on the following: a) Two - part tariff b) Power factor tariff. c) Three - part tariff	L2	CO2	PO1, PO2														
	b)	What is tariff and explain What are the factors affecting tariff?	L1	CO2	PO1														
14	a)	Define the base load and peak load plants?	L1	CO2	PO1														
	b)	A diesel station supplies the following loads to various consumers: Industrial consumer =1500 kw; commercial establishment =750 kw Domestic power =100kw; Domestic light= 450 kw If the maximum demand on the station is 2500kw and the number of kwh generated per year is 45×10^5 , determine i)diversity factor and ii)annual load factor	L1	CO2	PO1														
15	a)	The maximum demand on a power station is 100MW. If the annual load factor is 40%,calculate the total energy generated in a year.	L2	CO2	PO1, PO2														
	b)	Define i. connected load ii. maximum demand iii. Load duration curve	L1	CO2	PO1														

UNIT-III

Overhead Line Insulators & Underground Cables

S.No	Questions	BT	CO	PO
Part –A(Short Answer Questions)				
1	What are the applications of dc chopper?	L1	CO3	PO1
2	Name the important components of an overhead transmission line.	L1	CO3	PO1
3	What are the types of insulators?	L1	CO3	PO1
4	What is a static capacitor?	L1	CO3	PO1
5	What is meant by suspension insulator?	L1	CO3	PO1
6	What should be the desirable characteristics of insulating material used in cables?	L1	CO3	PO1
7	What are the types of cables?	L1	CO3	PO1
8	State different types of overhead conductors	L1	CO3	PO1
9	What is grading of cables?	L1	CO3	PO1

10	What are the types of cables?	L1	CO3	PO1
Part– B(Long Answer Questions)				
11	a) Derive an expression for capacitance of a single core cable.	L1	CO3	PO1
	b) Give a brief note of Capacitance grading mathematically	L1	CO3	PO1
12	a) What is an Underground cable & explain its construction with a neat diagram?	L1	CO3	PO1
	b) What is String efficiency and what are the methods to improve it	L1	CO3	PO1
13	a) Explain about Pin type & Suspension type insulators with neat diagrams?	L1	CO3	PO1
	b) Give a brief note of strain & shackle insulators with neat diagrams?	L3	CO3	PO1, PO2, PO3
14	a) Derive a mathematical expression for string efficiency of suspension type insulators	L1	CO3	PO1
	b) Each line of a 3-Phase system is suspended by a string of 3 similar insulators. If the voltage across the line unit is 17.5 KV, calculate the line to neutral voltage. Assume that the shunt capacitance between each insulator and earth is 1/8 of the capacitance of the insulator itself. Also find the string efficiency	L1	CO3	PO1
15	a) Calculate the capacitance & charging current of a single core cable used on a 3-ph, 66 KV system. The cable is 1 km long having a core diameter of 10cm & an insulation thickness of 7cm. Relative permittivity of insulation is 4 at 50Hz	L1	CO3	PO1
	b) Compare overhead lines and underground cables?	L1	CO3	PO1

UNIT-IV

Inductance & Capacitance Calculations of Transmission Lines and Corona

S.No	Questions	BT	CO	PO
Part –A(Short Answer Questions)				
1	Mention the advantages of using bundled conductors	L1	CO4	PO1
2	Define corona loss.	L1	CO4	PO1
3	What are the factors affecting corona loss	L1	CO4	PO1
4	Write the methods of reducing corona loss	L1	CO4	PO1
5	What are the disadvantages of corona?	L1	CO4	PO1
6	What is bundle conductor?	L1	CO4	PO1
7	What is transposition of transmission line?	L1	CO4	PO1
8	Define composite conductor.	L1	CO4	PO1
9	What is disruptive critical voltage?	L1	CO4	PO1
10	What is skin effect?	L1	CO4	PO1
Part– B(Long Answer Questions)				
11	a) Derive an expression for 3 phase capacitance in symmetrical & asymmetrical configuration	L1	CO4	PO1
	b) Derive an expression for 3 phase inductance in asymmetrical Configuration	L2	CO4	PO1, PO2
12	a) Derive an expression for inductance of a single phase two wire line.	L1	CO4	PO1
	b) Derive an expression for capacitance of a single phase two wire line.	L1	CO4	PO1
13	a) What are the different factors affecting the corona?	L1	CO4	PO1
	b) Explain about skin effect , proximity effect, corona effect?	L1	CO4	PO1

14	a)	What are the advantages and disadvantages of corona?	L1	CO4	PO1
	b)	Methods of reducing corona effect?	L1	CO4	PO1
15	a)	Explain about i) critical disruptive voltage ii)visual critical voltage iii)power loss due to corona	L1	CO4	PO1
	b)	Explain the effect of earth on capacitance calculations mathematically	L1	CO4	PO1

UNIT-V

A.C. and D.C. Distribution

S.No	Questions	BT	CO	PO	
Part –A(Short Answer Questions)					
1	What are the requirements of a distribution system?	L1	CO5	PO1	
2	What is the need of a sub-station in the power systems?	L1	CO5	PO1	
3	Why is unity power factor not the most economical power factor?	L1	CO5	PO1	
4	Indicate the advantages of Ring mains system	L1	CO5	PO1	
5	What is a gas insulated substation? State its advantages.	L1	CO5	PO1	
6	What is the significance of power factor?	L1	CO5	PO1	
7	Compare DC distribution with AC distribution system.	L1	CO5	PO1	
8	What are the requirements distribution systems?	L1	CO5	PO1	
9	How the substations are classified?	L1	CO5	PO1	
10	Write the requirements to select the site for sub station.	L1	CO5	PO1	
Part– B(Long Answer Questions)					
11	a)	A three phase ring main PQRS fed at P of 11 kV, supplies Apply 5balanced loads of50 A at 0.8 p.f lagging at Q, 120 A at unity p.f at R and 70A at 0.866 lagging at S, the resistances being referred to the various sections are: Section PQ = $(1+j0.6)$ ohm; section QR = $(1.2+j0.9)$ ohm; Section RS = $(0.8+j0.5)$ ohm; Section SP= $(3+j2)$ ohm. Determine the currents in various sections and station bus-bar voltages at Q, R and S	L1	CO5	PO1
	b)	A single phase AC distributor 1 km long has resistance and reactance per conductor of 0.1 ohm and 0.15 ohm respectively. At the far end, the voltage VB= 200 volts and the current is 100 A at the power factor of 0.8(lagging). At the midpoint M of the distributor, a current of 100A is tapped at a power factor0.6lagging with reference to the voltage VM at the midpoint. Calculate (a) Voltage at midpoint(b) Sending end voltage VA (c) Phase angle between VA and VB	L1	CO5	PO1
12	a)	A single phase distributor 2km long supplies a load of 120A at0.8 power factor lagging at its far end and a load of 80A at 0.9power factor lagging at its mid-point. Both power factors are referred to the voltage at the far end. The resistance and reactance per km (go and return) are 0.05ohms and0.1ohmsrespectively. If the voltage at the far end is maintained at 230V, calculate i) Voltage at the sending end. ii. Phase angle between the voltages at the two ends.	L1	CO5	PO1
	b)	Compare DC and AC distribution systems	L2	CO5	PO1, PO2
13	a)	Define feeder, distributor, service mains	L1	CO5	PO1
	b)	What are the advantages and dis advantages of ring main distributor?	L1	CO5	PO1
14	a)	Explain briefly the various systems of A.C distribution	L1	CO5	PO1
	b)	Explain the following with neat diagrams: i. AC 3-phase, 3wire distribution System ii. AC 3-phase, 4 wire system	L1	CO5	PO1

15	a)	What are the factors affecting to design feeder	L1	CO5	PO1
	b)	What are the factors affecting to design distributor	L1	CO5	PO1

***Blooms Taxonomy Level (BT)** (L1–Remembering; L2–Understanding; L3–Applying; L4–Analyzing; L5–Evaluating; L6–Creating)

Course Outcomes (CO) Program

Outcomes (PO)

Prepared By:

(Dept. of EEE)