

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE(A)
[B17EE4101]

IV B. Tech I Semester (R17) Regular Examinations
ELECTRIC DRIVES
ELECTRICAL AND ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

TIME: 3Hrs.

Max. Marks: 70 M

Answer **ONE Question** from **EACH UNIT**.
 All questions carry equal marks.

			CO	KL/ PO	M
UNIT-I					
1.	a).	Illustrate four quadrant operation of electric drive?	CO1	K4/ PO1 , PO2	7
	b).	A drive has the following parameters $T = (200 - 0.2N)\text{Nm}$. $T_1 = 100\text{Nm}$ where n is the speed in rpm. Initially the drive is operating in steady state, the characteristics of load torque are changed to -100Nm . Calculate the initial and final equilibrium speeds.	CO1	K4/ PO1 , PO2	7
OR					
2.	a).	Express functions of power modulator.	CO1	K4/ PO1 , PO2	7
	b).	A 220v, 875rpm, 150a, separately excited dc motor, an armature resistance of 0.05Ω . it is fed from single phase fully controlled rectifier with an ac source voltage of 220v, 50hz. assuming continuous conduction, figure out A.) Firing angle for rated motor torque and -500rpm B.) Motor speed for $\alpha = 160^\circ$ and rated torque.	CO1	K4/ PO1 , PO2	7
Unit-II					
3.	a).	Illustrate and derive single phase full converter fed separately excited dc drive for discontinuous mode of operation	CO2	K4/ PO1 , PO2 , PO3	7
	b).	200v, 875 rpm 150a separately excited dc motor has an armature resistance of 0.06Ω . It is fed from a single phase fully controlled rectifier with an ac source voltage of 220v, 50hz, Assuming continuous conduction. Figure out firing angle for rated motor torque and 750rpm	CO2	K4, PO1 , PO2 , PO3	7
OR					
4.	a).	Explain the chopper-controlled dc series motor with continuous current operation.	CO2	K4/ PO1	7

				, PO2 , PO3	
	b).	Explain the Closed loop control of DC drive Only Block Diagram	CO2	K4/ PO1 , PO2 , PO3	7
Unit-III					
5.	a).	Explain and derive speed torque expression for chopper controlled fed separately excited dc motor.	CO3	K4/ PO1 , PO2 , PO3	7
	b).	A 230v,960 rpm and 200aseparately excited dcmotor as an armature resistance of 0.02ohms the motor is fed from a chopper which provides both motoring and braking operation, the source has a voltage of 230v assume continuous conduction. Figure out I. Duty ratio of chopper for motoring operation at rated torque and 350 rpm ii. Duty ratio of chopper for braking operation at rated torque and 350 rpm	CO3	K4/ PO1 , PO2 , PO3	7
OR					
6.	a).	Explain the Chopper controlled DC separately excited motor and DC series motor	CO3	K4/ PO1 , PO2 , PO3	7
	b).	Explain the Continuous current operation in chopper controlled fed DCdrives.	CO3	K4/ PO1 , PO2 , PO3	7
Unit-IV					
7.	a).	Explain Static Kramer's Drive with circuit diagram	CO4	K4/ PO1 , PO2 , PO3	7
	b).	Explain Static Scherbius Drive with circuit diagram	CO4	K4/ PO1 , PO2	7

					PO3
OR					
8.	a).	A 440V,50HZ,970 RPM ,6 pole ,star-connected, three phase, wound rotor induction motor has following parameters referred to the stator $R_s = 0.1\text{ohms}$, $R_r = 0.08\text{ohms}$, $X_s = 0.3\text{ ohms}$ $X_r = 0.4\text{ ohms}$ the stator to rotor turns ratio is 2 motor speed is controlled by static scherbius drive, Drive is designed for a speed range of 25% below the synchronous speed ,maximum value of firing angle is 165° . Calculate i) transformer turns ratio ii) Torque for a speed of 780 RPM and $\alpha = 140^\circ$	CO4	K4/ PO1 , PO2 , PO3	7
	b).	Explain the operation of closed loop DC drive. In chopper controlled fed DC Drives	CO4	K4/ PO1 , PO2 , PO3	7
UNIT-V					
9.	a).	Illustrate motoring and generating modes of operation of a separately excited dc machine	CO5	K3/ PO1 , PO2 ,	7
	b).	Explain the True synchronous principal operation	CO5	K4/ PO1 , PO2 ,	7
OR					
10.	a).	Explain principal and operation of brush less DC motor drive	CO5	K4/ PO1 , PO2 ,	7
	b).	Explain the principal and operation of the stepper motor	CO5	K4/ PO1 , PO2 ,	7

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE(A)
[B17EE4102]

IV B. Tech I Semester (R17) Regular Examinations
POWER SYSTEM OPERATION AND CONTROL
ELECTRICAL AND ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

TIME: 3Hrs.

Max. Marks: 70 M

Answer **ONE Question** from **EACH UNIT**.
 All questions carry equal marks.

			CO	KL/ PO	M
UNIT-I					
1.	a).	Derive the equation for optimal load sharing among n units in a power system by neglecting transmission losses.	CO1	K3/ PO1	7
	b).	A constant 30MW supplied by two 150MW generators, 1 and 2 for which the respective incremental fuel costs are $dC1/dP1=0.1P1+20$, $dC2/dP2=0.2P2+25$. With P in MW and C in Rs/h. Calculate (i) the most economical division of load between the generators (ii) the saving in Rs/day there by obtain compared to equal load sharing between the machines.	CO1	K4/ PO2	7
OR					
2.	a).	Explain the problem of scheduling hydrothermal power plants. Explain the constraints in the problem.	CO1	K3/ PO1	7
	b).	A power system consists of two 200MW units whose input cost data are represented by the equations: $C1 = 0.03P1^2 + 21P1 + 750$ Rs/hour, $C2 = 0.5P2^2 + 18P2 + 980$ Rs/hour. If the total received power $P_R = 350$ MW, compute the load division between the units for the most economic operation.	CO1	K4/ PO2	7
Unit-II					
3.	a).	What is meant by unit commitment problem? Explain the need for unit commitment problem in operation of power system	CO2	K3/ PO1	7
	b).	With the help of flow chart, explain the solution of unit commitment problem using dynamic programming.	CO2	K3/ PO1	7
OR					
4.	a).	Discuss about different constraints considered in solving a unit commitment problem	CO2	K3/ PO1	7
	b).	Explain briefly about the different unit commitment solution methods.	CO2	K3/ PO1	7
Unit-III					
5.	a).	Discuss the importance of combined load frequency control and economic dispatch control with a neat block diagram.	CO3	K3/ PO1	7
	b).	Draw the block diagram of uncontrolled two area load frequency control system and explain the salient features under static condition.	CO3	K3/ PO1	7
OR					
6.	a).	Explain the mathematical modeling of speed governing system and derive the transfer function of speed governor model. State the assumptions made.	CO3	K3/ PO1	7
	b).	A 200 MVA synchronous generator is operating at 3000 rpm, 50Hz. A load of 40MW is suddenly applied to the machine and the steam valve of the turbine opens only after 0.4 sec due to the time lag in the generator action.	CO3	K4/ PO2	7

		Calculate the frequency to which the generated voltage drops before the steam flow commences to increase to meet the new load. Given that the value of H of the generator is 5.5 kW-sec/KVA of the generator capacity.			
Unit-IV					
7.	a).	What are the merits and demerits of shunt and series compensation?	CO4	K3/ PO1	7
	b).	A short transmission line having an impedance of $(2+j3)$ ohms interconnects two power stations A and B both operating at 11 kV; equal in magnitude and phase. To transfer 25 MW at 0.8 p.f. lagging from A to B determine the voltage boost required at plant A.	CO4	K4/ PO2	7
OR					
8.	a).	What do mean by compensation of a line? Discuss briefly different methods of compensation.	CO4	K3/ PO1	7
	b).	Define fundamentals of FACTS devices and Write the need for FACTS controllers.	CO4	K3/ PO1	7
UNIT-V					
9.	a).	Explain the concepts of coherent area dynamic with a detailed example.	CO5	K3/ PO1	7
	b).	Discuss about long term frequency dynamics and center of inertia.	CO5	K3/ PO1	7
OR					
10.	a).	Explain the stability enhancement methods	CO5	K3/ PO1	7
	b).	Explain the four operating states of Power system with a neat sketch.	CO5	K3/ PO1	7

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE(A)
[B17EE4103]

IV B. Tech I Semester (R17) Regular Examinations
ELECTRIC VEHICLES
ELECTRICAL AND ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

TIME: 3Hrs.

Max. Marks: 70 M

Answer **ONE Question** from **EACH UNIT**.
 All questions carry equal marks.

			CO	KL/ PO	M
UNIT-I					
1.	a).	Explain in detail evolution of EVs.	CO1	K4/ PO7	7
	b).	Describe Vehicle dynamics with fixed tractive effort	CO1	K4/ PO2	7
OR					
2.	a).	Compare EV with IC Engine Vehicle.	CO1	K4/ PO2	7
	b).	What Vehicle resistance, explain in detail	CO1	K4/ PO2	7
Unit-II					
3.	a).	Explain in detail EV motor sizing	CO2	K4/ PO2	7
	b).	Discuss Various configurations of EVs in detail	CO2	K4/ PO2	7
OR					
4.	a).	Discuss in detail about power train components.	CO2	K4/ PO2	7
	b).	Explain the operation of parallel HEV	CO2	K4/ PO2	7
Unit-III					
5.	a).	What is the importance of lead acid battery, explain its operation?	CO3	K4/ PO7	7
	b).	Explain in Detail Battery Management System in EVs	CO3	K4/ PO2	7
OR					
6.	a).	What are various battery performance parameters and compare various batteries by using the battery performance parameters	CO3	K4/ PO2	7
	b).	What are various Li ion batteries and explain their operation and how safety is important in handling the lithium ion batteries	CO3	K4/ PO7	7
Unit-IV					
7.	a).	Explain the working schematic of DC drives with respect to EV.	CO4	K4/ PO2	7
	b).	Explain the working schematic of SRM drives with respect to EV.	CO4	K4/ PO2	7
OR					

8.	a).	Explain the working schematic of PM-BLDC drives with respect to EV.	CO4	K4/ PO2	7
	b).	Explain the working of Electric Drive Components	CO4	K4/ PO2	7
UNIT-V					
9.	a).	Explain various charging algorithms of EVs	CO5	K4/ PO3	7
	b).	What is the need of Power aggregator in infrastructure system, explain in detail	CO5	K4/ PO6	7
OR					
10.	a).	Explain in detail V2G Technology	CO5	K4/ PO3	7
	b).	What are various wireless power transfer techniques, Explain in detail Inductive power Transfer System in EVs	CO5	K4/ PO6	7

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE(A)
[B17EE4104]

IV B. Tech I Semester (R17) Regular Examinations
Elective-I : OPERATIONS RESEARCH
ELECTRICAL AND ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

TIME: 3Hrs.

Max. Marks: 70 M

Answer **ONE Question** from **EACH UNIT**.
 All questions carry equal marks.

			CO	KL/ PO	M
UNIT-I					
1.	a).	A firm manufactures two types of products A & B and sells them at a profit of Rs. 2/- on type-A and Rs. 3/- on type-B. Each product is processed on two machines G and H. Type-A requires 1 min. of processing time on G and 2 min. on H, type-B requires 1 min. on G and 1 min. on H. The machine G is available for not more than 6 hrs 40 min while machine H is available for 10 hrs during any working day. Formulate the problem as a Linear Programming Problem (LPP).	CO1	K3, K4/ PO1 PO2	7
	b).	Using graphical method, solve the following LPP Maximize $Z = 3x_1 + 4x_2$ Subject to the constraints $2x_1 + x_2 \leq 40$ $2x_1 + 5x_2 \leq 180$ and $x_1 \geq 0, x_2 \geq 0$	CO1	K3/ PO1	7
OR					
2.	a).	State the general Linear Programming Problem and put it in the standard form and also explain slack and surplus variables.	CO1	K3/ PO1	6
	b).	Solve the following LPP by using simplex method Minimize $Z = x_1 - 3x_2 + 2x_3$ Subject to the constraints $3x_1 - x_2 + 3x_3 \leq 7$ $-2x_1 + 4x_2 \leq 12$ $-4x_1 + 3x_2 + 8x_3 \leq 10$ and $x_1, x_2, x_3 \geq 0$.	CO1	K3/ PO1	8
Unit-II					

		1	11	17	8	16	20			
		2	9	7	12	6	15			
		3	13	16	15	12	16			
		4	21	24	17	28	26			
		5	14	10	12	11	15			

OR

6.	a).	Compare assignment and transportation problem.		CO3	K3/ PO1	4
	b).	Solve the assignment problem.		CO3	K3/ PO1	10

	I	II	III	IV	V
1	160	130	175	190	200
2	135	120	130	160	175
3	140	110	155	170	185
4	50	50	80	80	110
5	55	35	70	80	105

Unit-IV

7.	a).	Explain the terms : (i) Total float (ii) Optimistic time		CO4	K3/ PO1	4
	b).	A Project is composed of the following activities whose time estimates are listed below:		CO4	K3/ PO1	10

Activity (i - j)	Estimated duration (weeks)		
	Optimistic	Most likely	Pessimistic
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8

			2-5	1	1	1			
			3-5	2	5	14			
			4-6	2	5	8			
			5-6	3	6	15			

(a) Draw the project network and calculate the early and late occurrence times for each event.

(b) Find the critical path and its standard deviation.

(c) What is the probability that the project will be completed 4 weeks earlier than expected?

OR

8.	a).	Explain Fulkerson's rule with suitable example.	CO4	K3/ PO1	4
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	b).	A Project is composed of the following activities whose time estimates are listed below:	CO4	K3/ PO1	10
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Activity	Predecessors	Estimated duration		
		Optimistic	Most likely	Pessimistic
A	-	5	6	7
B	-	1	3	5
C	-	1	4	7
D	A	1	2	3
E	B	1	2	9
F	C	1	5	9
G	C	2	2	8
H	E, F	4	4	10
I	D	2	5	8
J	H, G	2	2	8

(a) Draw the project network

(b) Calculate expected time and variance of each activity.

		(c) Find the critical path and its standard deviation.																															
UNIT-V																																	
9.	a).	Distinguish between a pure strategy and mixed strategy of a rectangular game.	CO5	K3/ PO1	4																												
	b).	Solve the following game graphically, <div style="text-align: center;"> <table border="1"> <tr> <td colspan="2"></td> <td colspan="3">Player-B</td> </tr> <tr> <td colspan="2"></td> <td>3</td> <td>-3</td> <td>4</td> </tr> <tr> <td rowspan="2" style="vertical-align: middle;">Player-A</td> <td></td> <td>-1</td> <td>1</td> <td>-3</td> </tr> </table> </div>			Player-B					3	-3	4	Player-A		-1	1	-3	CO5	K3, K4/ PO1 PO2	10													
		Player-B																															
		3	-3	4																													
Player-A		-1	1	-3																													
	OR																																
10.	a).	What is a two-person zero-sum game? Define the saddle point of such a game.	CO5	K3/ PO1	4																												
	b).	Solve the following game, using the concept of dominance <div style="text-align: center;"> <table border="1"> <tr> <td colspan="2"></td> <td colspan="4">Player-B</td> </tr> <tr> <td colspan="2"></td> <td>B₁</td> <td>B₂</td> <td>B₃</td> <td>B₄</td> </tr> <tr> <td rowspan="3" style="vertical-align: middle;">Player-A</td> <td>A₁</td> <td>8</td> <td>10</td> <td>9</td> <td>14</td> </tr> <tr> <td>A₂</td> <td>10</td> <td>11</td> <td>8</td> <td>12</td> </tr> <tr> <td>A₃</td> <td>13</td> <td>12</td> <td>14</td> <td>13</td> </tr> </table> </div>			Player-B						B₁	B₂	B₃	B₄	Player-A	A₁	8	10	9	14	A₂	10	11	8	12	A₃	13	12	14	13	CO5	K3, K4/ PO1 PO2	10
		Player-B																															
		B₁	B₂	B₃	B₄																												
Player-A	A₁	8	10	9	14																												
	A₂	10	11	8	12																												
	A₃	13	12	14	13																												

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE(A)
[B17EE4105]

IV B. Tech I Semester (R17) Regular Examinations
Elective-I: FLEXIBLE AC TRANSMISSION SYSTEM
ELECTRICAL AND ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

TIME: 3Hrs.

Max. Marks: 70 M

Answer **ONE Question** from **EACH UNIT**.
 All questions carry equal marks.

			CO	KL/ PO	M
UNIT-I					
1.	a).	Outline the necessity of reactive power in power system?	CO1	K3/ PO1	7
	b).	Explain the problems associated with synchronous condenser?	CO1	K3/ PO1	7
OR					
2.	a).	Explain the operation of Thyristor-Switched Capacitor (TSC).	CO2	K4/ PO2	7
	b).	Explain the operation of Thyristor-Controlled Reactor (TCR).	CO2	K4/ PO2	7
Unit-II					
3.	a).	Design the SVC voltage regulator based on system gain.	CO3	K4/ PO3	14
OR					
4.	a).	Explain the Influence of SVC on system voltage	CO3	K4/ PO2	7
	b).	Outline the Enhancement of transient stability using SVC.	CO4	K4/ PO2	7
Unit-III					
5.		Explain the operation of a STATCOM? Also derive the steady state model of it.	CO3	K4/ PO2	14
OR					
6.	a).	Compare between SVC and STATCOM.	CO3	K4/ PO2	7
	b).	With a neat block diagram, explain the Sub-Synchronous Resonance (SSR) Mitigation by using STATCOM.	CO4	K4/ PO2	7
Unit-IV					
7.		Explain the operation of TCSC. Also explain different modes of it.	CO3	K4/ PO2	14
OR					
8.	a).	Discuss the variable reactance model of TCSC.	CO3	K4/ PO2	7
	b).	Discuss the system damping improvement using thyristor-controlled series capacitor (TCSC).	CO5	K4/ PO2	7
UNIT-V					

9.	a).	With a neat block diagram, explain the Sub-Synchronous Resonance (SSR) Mitigation by using SSSC.	CO5	K4/ PO2	7
	b).	Compare between SSSC and TCSC.	CO3	K4/ PO2	7
OR					
10.		Explain the operation of a SSSC with its control system.	CO3	K4/ PO2	14

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE(A)
[B17EE4106]

IV B. Tech I Semester (R17) Regular Examinations
Elective-I: INTEGRATION OF DISTRIBUTED GENERATION
ELECTRICAL AND ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

TIME: 3Hrs.

Max. Marks: 70 M

Answer **ONE Question** from **EACH UNIT**.
 All questions carry equal marks.

			CO	KL/PO	M
		UNIT-I			
1.	a).	List the different reasons for new type of power production in the power system	CO1	K3/PO1	7
	b).	Explain persuasively how power is produced from wind list out the properties of wind power	CO1	K3/PO1	7
		OR			
2.	a).	Enumerate the main barriers to the wide scale use of renewable energy	CO1	K3/PO1	7
	b).	Briefly explain the different MPPT algorithms incorporated within the interface technology	CO1	K3/PO1	7
		UNIT-II			
3.	a).	With a neat figure explain two possible schemes of interfacing distributed generation to grid.	CO2	K3/PO1	7
	b).	Discuss four different approaches to prevent DG interfering with the ability of power system to fulfill its primary aims.	CO2	K3/PO1	7
		OR			
4.	a).	Explain direct machine coupling with the grid	CO2	K3/PO1	7
	b).	Write a note on power quality concerned to distributed generation	CO2	K3/PO1	7
		UNIT-III			
5.	a).	Outline the schemes used during connecting large generator unit into the network	CO3	K3/PO1	7
	b).	Briefly explain, how voltage magnitude variations impact the design of distributed generation	CO3	K3/PO1	7
		OR			
6.	a).	Explain Knowledge Server for Controllers (KSC) used in energy management system	CO3	K3/PO1	7
	b).	Explain basic design rules of distribution feeders	CO3	K3/PO1	7
		UNIT-IV			
7.	a).	Discuss how strong feeders increase the hosting capacity.	CO4	K4/PO2	7
	b).	List the various power quality disturbances developed due to distributed generation	CO4	K4/PO2	7
		OR			

8.	a).	Explain the dynamic voltage control used for increasing the hosting capacity	CO4	K4/PO2	7
	b).	Explain two main sources of unbalanced voltage at transmission level	CO4	K4/PO2	7
UNIT-V					
9.	a).	What is the maximum permissible voltage distortion according to IEEE standard and briefly explain low frequency harmonics in distributed generation	CO5	K4/PO2	7
	b).	Summarize high frequency distortion as power quality disturbance	CO5	K4/PO2	7
OR					
10.	a).	List the causes of voltage dips in distributed generation	CO5	K4/PO2	7
	b).	Outline the measures required to increase the hosting capacity when power quality disturbance sets the limit to distributed generation interconnection	CO5	K4/PO2	7

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE(A)
[B17EE4107]

IV B. Tech I Semester (R17) Regular Examinations
Elective-II: HIGH VOLTAGE ENGINEERING
ELECTRICAL AND ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

TIME: 3Hrs.

Max. Marks: 70 M

Answer **ONE Question** from **EACH UNIT**.
 All questions carry equal marks.

			CO	KL/PO	M
UNIT-I					
1.	a).	Explain the importance of electric field stress developed in insulating materials.	CO1	K2/ PO1	7
	b).	Write the advantages and disadvantages of the various numerical methods.	CO1	K2/ PO1	7
OR					
2.	a).	Explain uniform and non-uniform field configuration of electrodes.	CO1	K2/ PO1	7
	b).	Define finite element method, briefly explain the four steps involved in the finite element analysis of any problem.	CO1	K4/ PO2	7
UNIT-II					
3.	a).	Explain Townsend's current growth equation.	CO2	K4/ PO2	7
	b).	Explain briefly about electro mechanical breakdown.	CO2	K2/ PO1	7
OR					
4.	a).	Discuss about Paschen's law briefly.	CO2	K4/ PO2	7
	b).	Explain Breakdown in composite dielectrics	CO2	K2/ PO1	7
UNIT-III					
5.	a).	With a neat diagram explain the working of Impulse Voltage generator.	CO3	K4/ PO2	7
	b).	Give the classification of different forms of high voltages.	CO3	K2/ PO2	7
OR					
6.	a).	With a neat diagram explain the working of Vande Graff Generators.	CO3	K4/ PO2	7
	b).	Explain tripping and control of impulse generators	CO3	K4/ PO2	7
UNIT-IV					
7.	a).	Explain the measurement of high dc voltages by connecting very high resistance in series with a micrometer. Also mention limitations in the series resistance.	CO4	K4/ PO2	7
	b).	Explain how Impulse current can be Measured.	CO4	K4/	7

				PO2	
		OR			
8.	a).	Explain the different methods of high d.c, a.c and impulse current measurement with their relative merits demerits.	CO4	K2/ PO2	7
	b).	Explain with neat diagram the principle of operation of an electrostatic voltmeter. Discuss its advantages and limitations for high voltage measurements.	CO4	K4/ PO2	7
		UNIT-V			
9.	a).	Draw the schematic diagram of electrostatic precipitator and explain.	CO5	K4/ PO2	7
	b).	Explain the industrial applications of high energy rate pulsed power generator.	CO5	K4/ PO2	7
		OR			
10.	a).	Explain Wheatstone bridge arrangement for resistivity measurement.	CO5	K4/ PO2	7
	b).	Draw the circuit for partial discharge measurement and explain how it works.	CO5	K4/ PO2	7

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE(A)
[B17EE4108]

IV B. Tech I Semester (R17) Regular Examinations
Elective-II: ELECTRIC POWER QUALITY
ELECTRICAL AND ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

TIME: 3Hrs.

Max. Marks: 70 M

Answer **ONE Question** from **EACH UNIT**.

All questions carry equal marks.

			CO	KL/ PO	M
UNIT-I					
1.	a).	Define Power Quality? with a neat sketch explain different types of power quality problems.	CO1	K3/ PO1	7
	b).	Explain the short-duration voltage variations. Compare short-duration voltage variations with long-duration voltage variations.	CO1	K4/ PO2	7
OR					
2.	a).	What is the impact of transient on power quality? Classify the transients that occur in power systems.	CO1	K3/ PO1	7
	b).	Explain the following: a) Voltage Unbalance b) Waveform Distortion c) Voltage fluctuation Power Frequency Variations	CO1	K3/ PO1	7
Unit-II					
3.	a).	Define voltage sag and voltage interruption. What is their impact on equipment connected? Discuss the sources of sags and interruptions	CO2	K3/ PO1	7
	b).	What are the main sources of transient over voltages? Explain the capacitor switching transient over voltages in detail.	CO2	K3/ PO1	7
OR					
4.	a).	Explain and analyze various devices used for the protection of equipment from the over voltages due to transients	CO2	K4/ PO2	7
	b).	Discuss the principles of over voltage protection of load equipment	CO2	PO1	7
Unit-III					
5.	a).	Explain the following harmonic indices in detail: (i) Total Harmonic Distortion (ii) Total Demand Distortion	CO3	K3/ PO1	7
	b).	What is the need of locating harmonic sources? Explain the power system response characteristics under the presence of harmonics.	CO3	K3/ PO1	7
OR					
6.	a).	Discuss the impact of harmonic distortion on transformers and capacitors	CO3	K3/ PO1	7
	b).	Explain about the controlling of harmonics using passive and active filters. How active filters overcome the drawbacks of passive filters in controlling of harmonics.	CO3	K4/ PO2	7

Unit-IV					
7.	a).	Discuss how the capacitors are used for voltage regulation in power systems in shunt and series configuration.	CO4	K3/ PO1	7
	b).	Analyze various devices used for voltage regulation in long duration voltage variation	CO4	K4/ PO2	7
OR					
8.	a).	What is meant by voltage flicker. List some sources of flicker. Discuss the methods for mitigation of flicker.	CO4	K3/ PO1	7
	b).	Describe how utilities can deal with problems related to capacitor-switching transients.	CO4	K4/ PO2	7
UNIT-V					
9.	a).	Analyze the power quality issues when the DG is integrated to utility system	CO5	K4/ PO2	7
	b).	Explain how the utility voltage is regulated with distributed resources.	CO5	K3/ PO1	7
OR					
10.	a).	What are the problems that are noticed when the DG is interfaced to the utility system. Analyze the impact of DG interface to utility system.	CO5	K4/ PO2	7
	b).	Apply the solutions to wiring and grounding problems due to interconnection of DG to improve power quality.	CO5	K3/ PO1	7

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE(A)
[B17EE4109]

IV B. Tech I Semester (R17) Regular Examinations
Elective-II: ENERGY MANAGEMENT AND AUDITING
ELECTRICAL AND ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

TIME: 3Hrs.

Max. Marks: 70 M

Answer **ONE Question** from **EACH UNIT**.

All questions carry equal marks.

			CO	KL/ PO	M
UNIT-I					
1.	a).	What is energy audit? What are the different types of audit?	CO1	K3/ PO1	7
	b).	What is a load profile? Explain about different types of load profile.	CO1	K3/ PO1	7
OR					
2.	a).	What is an energy management? Explain the importance of energy management.	CO1	K3/ PO1	7
	b).	List the types of energy conservation methods and discuss their merits and demerits.	CO1	K3/ PO1	7
Unit-II					
3.	a).	Discuss about the flood lighting scheme.	CO2	K3/ PO1	7
	b).	Brief out the conservation measures in lighting schemes.	CO2	K4/ PO2	7
OR					
4.	a).	Explain the significance of polar curve.	CO2	K4/ PO2	7
	b).	How the existing lighting system is replaced for the improvement?	CO2	K4/ PO2	7
Unit-III					
5.	a).	Compare the features of static capacitor and synchronous condenser used for power factor correction.	CO3	K4/ PO2	7
	b).	Discuss the effect of non linear loads on power factor.	CO3	K4/ PO2	7
OR					
6.	a).	Discuss the vector diagram for a system where capacitor improves the power factor	CO3	K3/ PO1	7
	b).	Define harmonics. Discuss the effect of harmonics on the system power factor.	CO3	K3/ PO1	7
Unit-IV					
7.	a).	Explain the principle of present worth method with an example.	CO4	K4/ PO2	7
	b).	Discuss the merits and demerits of time value of money	CO4	K3/ PO1	7

				PO1	
OR					
8.	a).	Explain the principle of life cycle costing analysis with an example	CO4	K4/ PO2	7
	b).	Discuss the concept of energy efficient motors	CO4	K3/ PO1	7
UNIT-V					
9.	a).	Explain the net present worth method used for analysis of economics in energy management.	CO5	K3/ PO1	7
	b).	Explain the concept return on investment.	CO5	K3/ PO1	7
OR					
10.	a).	Discuss one application of life cycle costing analysis.	CO5	K3/ PO1	7
	b).	Explain the technologies adopted in energy efficient lighting systems.	CO5	K4/ PO2	7

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE(A)
[B17EE4201]

IV B. Tech II Semester (R17) Regular Examinations
ELECTRICAL MACHINE DESIGN
ELECTRICAL AND ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

TIME: 3Hrs.

Max. Marks: 70 M

Answer **ONE Question** from **EACH UNIT**.

All questions carry equal marks.

			CO	KL/PO	M
UNIT-I					
1.	a).	Write the limitations involved in designing electrical machines	CO1	K3/PO1	7
	b).	Explain different methods for cooling of electrical machines?	CO1	K3/PO1	7
OR					
2.		State and explain the factors which govern the choice of specific magnetic loading and specific electric loading.	CO1	K3/PO1	14
UNIT-II					
3.	a).	Derive the output equation of a DC Machine in terms of its main dimensions.	CO2	K4/PO3	7
	b).	A 4 pole wave wound armature has 230 conductors and 23 Commutator segments. Give the table of winding connections in terms of coil sides. Choose a Retrogressive winding.	CO2	K4/PO3	7
OR					
4.	a).	List out the procedure involved in the design of shunt field winding and series field winding.	CO2	K4/PO3	7
	b).	A 4-pole, 25 HP, 500V, 600 rpm series motor has an efficiency of 82%. The pole faces are square and the ratio of pole arc to pole pitch is 0.67. Take $B_{av}=0.58 \text{ wb/m}^2$ and $a_c=17000$ ampere conductors/meter. Obtain the main dimensions of the core.	CO2	K4/PO3	7
UNIT-III					
5.		Explain how heat generated in a transformer can be managed. Give a detailed scheme.	CO3	K4/PO3	14
OR					
6.		Derive an expression for output in KVA in terms of its main dimensions for 3-phase transformer.	CO3	K4/PO3	14
UNIT-IV					
7.	a).	Derive the output equation of an Induction motor.	CO4	K4/PO3	7
	b).	Find the value of diameter and length of stator core of a 7.5KW, 220V, 50Hz, 4 pole, 3-phase induction motor for best power factor. Magnetic loading= 0.4 wb/m^2 ; S_p .	CO4	K4/PO3	7

		Electric loading=22000A/m, Efficiency=0.86; power factor=0.87. core length/pole pitch= 1.0.			
OR					
8.	a).	Write the rules for selecting stator and rotor slots of three phase slip ring induction motor?	CO4	K4/PO3	7
	b).	Determine the main dimensions, no of turns per phase, conductor cross section and slot area of a 250 HP, 3phase ,50HZ, 400v, 1410 rpm slip ring induction motor. Assume specific magnetic loading $B_{av}=0.5T$, specific electric loading $a_c=30000$ ampere conductors per meter, efficiency is 90%, winding factor is 0.955, current density is 3.5 A/sq mm. The slot space factor is 0.4 and ratio of core length to pole pitch is 1.2. The machine is delta connected	CO4	K4/PO3	7
UNIT-V					
9.	a).	Give the various factors to be considered for the selection of stator slots of a 3- phase alternator.	CO5	K4/PO3	7
	b).	Determine the main dimensions of a 25 MVA, 50 Hz, 3-phase turbo alternator, given mean gap density=0.5 Tesla, specific electric loading of 550 ampere conductors per cm. of armature periphery; peripheral speed should not exceed 145 m/s; Air gap is 3 cm.	CO5	K4/PO3	7
OR					
10.		Give the developed view for the R-phase of a 3-phase, 4 pole, 24 slots, and star connected lap winding with coil short pitched by one slot. Each slot contains two coil sides. Phase sequence is RYB.	CO5	K4/PO3	14

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE(A)
[B17EE4202]

IV B. Tech II Semester (R17) Regular Examinations
Elective-III: ELECTRICAL DISTRIBUTION SYSTEMS
ELECTRICAL AND ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

TIME: 3Hrs.

Max. Marks: 70 M

Answer **ONE Question** from **EACH UNIT**.

All questions carry equal marks.

			CO	KL/ PO	M
UNIT-I					
1.	a).	Define and explain the following terms with suitable examples: (i) load factor, (ii) loss factor, (iii) Contribution factor and (iv) diversity factor.	CO1	K3/ PO1	7
	b).	A substation supplied the following loads: 175MW, 100MW, 75MW, 50MW and 10MW. The station has a maximum demand of 250MW. Determine the following, if annual load factor of the station is 45% (i) Number of units supplied annually (ii) Diversity factor (iii) Demand factor.	CO1	K4/ PO2	7
OR					
2.	a).	Obtain the relation between load factor and lossfactor.	CO1	K3/ PO1	7
	b).	A substation is to supply three regions of loads whose maximum values are 6000kW,10000kWand5000kW.The diversityfactoroftheloadatthesub stationis 1.5 and the average annual load factor is 0.65. Calculate the peak demand on the substation and annual energy supplied fromthe substation.	CO1	K4/ PO2	7
Unit-II					
3.	a).	What are the various factors that are to be considered in selecting primary feeder rating? Give a neat sketch of typical primary distribution feeder.	CO2	K3/ PO1	7
	b).	Derive the percentage voltage drop of a substation service area with 'n' number of primary feeders.	CO2	K3/ PO1	7
OR					
4.	a).	What are the types of basic distribution system?Explain.	CO2	K3/ PO1	7
	b).	Draw the single line diagram of radial type primary feeder and mention the factors that influence the selection ofprimaryfeeder.	CO2	K3/ PO1	7
Unit-III					

5.	a).	Obtain the expression for voltage drop and power loss for uniformly radial type distribution load.	CO3	K4/ PO2	7
	b).	If $Z_1 = 15 \angle -30^\circ$, $Z_2 = 20 \angle 80^\circ$ and $Z_3 = 20 \angle +90^\circ$ are the impedances connected in the form of delta and the supply voltage is 400V. Assume the RBY sequence and so find the phase currents, line currents and the total power absorbed.	CO3	K4/ PO2	7
OR					
6.	a).	Derive the expression for voltage drop and power loss for non-uniformly radial type distribution load.	CO3	K4/ PO1 PO2	7
	b).	Assume that a star connected three-phase load is made up of three impedances of $50 \angle 25^\circ$ ohms each and that the load is supplied by a 3-phase, four wire primary feeder. The balanced line to neutral voltages at the receiving end are: $V_{an}=7630 \angle 0^\circ$ V, $V_{bn}=7630 \angle 240^\circ$ V and $V_{cn}=7630 \angle 120^\circ$. Determine the a) The phase currents in each line and (b) The total active and reactive power supplied to the load.	CO3	K4/ PO2	7
Unit-IV					
7.	a).	How is the coordination between main fuse and sectional fuse achieved with neat diagram?	CO4	K3/ PO1	7
	b).	What are the common faults in a single phase, 2-wire and 3-wire system? Explain how fault current is computed with single line diagram.	CO4	K3/ PO1	7
OR					
8.	a).	Explain the coordination procedure between recloser and fuse.	CO4	K3/ PO1	7
	b).	What are the main objectives of distribution system protection? Discuss.	CO4	K3/ PO1	7
UNIT-V					
9.	a).	How is economical p.f arrived at for a given distribution system with different loads.	CO5	K3/ PO1	7
	b).	Give the best values of capacitor banks to improve the load p.f. from 0.75 to 0.9 from the following data: Load 800 kVA, operating voltage 3.3 kV (i) Star connection and (ii) Delta connection.	CO5	K4/ PO2	7
OR					
10.	a).	Explain the necessity of voltage control and p.f. correction in distribution systems.	CO5	K3/ PO1	7
	b).	What are the numerous ways to improve the distribution system's overall voltage regulation? How is line drop compensation made?	CO5	K3/ PO1	7

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE(A)
[B17EE4203]
IV B. Tech II Semester (R17) Regular Examinations
Elective-III: UTILIZATION OF ELECTRICAL ENERGY & TRACTION
ELECTRICAL AND ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

TIME: 3Hrs.

Max. Marks: 70 M

Answer **ONE Question** from **EACH UNIT**.

All questions carry equal marks.

			CO	KL/ PO	M
UNIT-I					
1.	a).	Explain the advantages of electric heating..	CO1	K3/ PO1	7
	b).	With a neat diagram, explain the working of metallic Arc welding.	CO1	K3/ PO1	7
OR					
2.	a).	Compare between AC welding and DC welding	CO1	K3/ PO1	7
	b).	Explain the principle of dielectric heating. Also write the applications of Dielectric heating.	CO1	K3/ PO1	7
UNIT-II					
3.	a).	Define inverse square law and cosine cube law of illumination.	CO2	K3/ PO1	7
	b).	A lamp giving 300 C.P in all directions below horizontal is suspended 2m above the centre of a square table of 1m side. Calculate the maximum and minimum illumination on the surface of the table.	CO2	K4/ PO2	7
OR					
4.	a).	What is photometry? Explain photovoltaic method of photometry.	CO2	K3/ PO1	7
	b).	A lamp with mean spherical candle power of 1000 is suspended at a height of 1.2m. Determine i) total flux emitted by the lamp ii) the illumination just below the lamp.	CO2	K4/ PO2	7
UNIT-III					
5.	a).	Sketch the typical speed-time curves for mainline service and suburban service with electric traction.	CO3	K3/ PO1	7
	b).	Explain Regenerative braking applied to 3- Φ induction motor. Also mention their advantages.	CO3	K3/ PO1	7
OR					
6.	a).	List and explain different braking schemes used in electric traction drives. Also mention their advantages and disadvantages.	CO3	K4/ PO2	14
UNIT-IV					
7.	a).	What is specific energy consumption of a train? Explain various factors affecting it.	CO4	K3/ PO1	7

	b).	A suburban train runs with an average speed of 36 kmph between two stations 1.8 km apart. The values of acceleration and retardation are 1.8 kmphs and 3.6 kmphs. Calculate the maximum speed of the train assuming trapezoidal speed-time curve.	CO4	K4/ PO2	7
OR					
8.	a).	An electric train has an average speed of 42 kmph on a level track between stops 1400 m apart. It is accelerated at 1.7 kmphs and it is braked at 3.3 kmphs. Draw the speed time curve for the run. Estimate energy consumption at the axels of the train per tonne per km. Take the tractive resistance constant at 50 Newton per tonne and allow 10 percent rotational inertia.	CO4	K4/ PO2	7
	b).	Define the following Adhesive Weight, Coefficient of Adhesion and Tractive Effort. Explain what are the factors that affect them.	CO4	K4/ PO2	7
UNIT-V					
9.	a).	What are the factors effecting the quality of electro deposition.	CO5	K3/ PO1	7
	b).	Explain the vapour compression and vapour absorption refrigeration systems.	CO5	K3/ PO1	7
OR					
10.		Give a neat sketch of the electrical circuit used in (i) water cooler and (ii) refrigerator	CO5	K3/ PO1	14

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE(A)
[B17EE4204]

IV B. Tech II Semester (R17) Regular Examinations
Elective-III: HVDC TRANSMISSION
ELECTRICAL AND ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

TIME: 3Hrs.

Max. Marks: 70 M

Answer **ONE Question** from **EACH UNIT**.

All questions carry equal marks.

			CO	KL/ PO	M
UNIT-I					
1.	a).	Explain in detail about general considerations of hvdc transmission systems	CO1	K3/ PO1	7
	b).	Explain in detail about power handling capabilities of hvdc transmission systems	CO1	K3/ PO1	7
OR					
2.	a).	Explain in detail about basic conversion principles in hvdc transmission	CO1	K3/ PO1	7
	b).	Explain in detail about static power converter configurations	CO1	K3/ PO1	7
UNIT-II					
3.	a).	Explain about 3pulse and 6 pulse converters in hvdc transmission systems.	CO2	K3/ PO1	7
	b).	Explain about 12 pulse converters and operation of rectifier and inverter in hvdc transmission systems.	CO2	K3/ PO1	7
OR					
4.	a).	Explain about commutation process in hvdc converters	CO2	K3/ PO1	7
	b).	Explain about rectifier and inverter operation with equivalent circuits in hvdc transmission systems.	CO2	K3/ PO1	7
UNIT-III					
5.		Explain in detail about harmonics in hvdc transmission systems	CO3	K3/ PO1	14
OR					
6.		Explain in detail about filters to eliminate harmonics in hvdc transmission systems	CO3	K3/ PO1	14
UNIT-IV					
7.		Explain in detail about Constant current and constant extinction angle control in hvdc transmission systems	CO4	K3/ PO1	14
OR					

8.		Explain in detail about equidistant angle control and dc power flow in hvdc transmission systems	CO4	K3/ PO1	14
UNIT-V					
9.		Explain in detail about Interaction between HVDC and HVAC systems	CO5	K3/ PO1	14
OR					
10.		Explain in detail about Voltage interaction, Harmonic instability problems in hvdc transmission systems.	CO5	K3/ PO1	14
