Code: 7G253

III B.Tech. I Semester Supplementary Examinations March/April 2023

Electrical Power Transmission

(Electrical and Electronics Engineering)

Max. Marks: 70   Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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			Marks	CO	BL

UNIT–I

1.	Derive the mathematical Expression of Inductance per phase of 3-phase double circuit unsymmetrical line which is transposed by using GMD-GMR method	14M	1	3

OR

2.	What is the adverse effect of Ground on the transmission lines? Give the mathematical proof to show this effect on the 3- lines?	14M	1	2

UNIT–II

3.	Derive A, B, C, D constants of Medium Transmission line with Nominal T and Nominal-pi Representation.	14M	2	5

OR

4.	Discuss in detail the nominal- representation with neat circuit diagram and phasor diagram. Derive also its performance specifications.	14M	2	2

UNIT–III

5.	A three phase 50 Hz, 250 km long transmission line has three conductors each of 0.75 cm radius spaced at the corners of the sides 2.5 m, 3 m and 3.5 m. the resistance of each conductor is 0.3 /km and the line delivers 30 MVA at a lagging power factor of 0.95. Determine ABCD constants, Vs, Is and Regulation by using rigorous solution.	14M	2	5

OR

6.	Obtain the equivalent T and representations of long transmission line using mathematical analysis.	14M	2	2

UNIT–IV

7. a)	Define Critical Disruptive Voltage and Visual Disruptive Voltage.	4M	4	1
b)	Develop an expression for Critical Disruptive Voltage for 1- two wire lines.	10M	4	6

OR

8.	What is Sag? Derive the expressions for Sag when the supporting towers are of equal and unequal heights.	14M	4	3

UNIT–V

9.	Develop Generalized expression to find the voltage across one disc, if the voltage across another disc is known in suspension type insulators.	14M	4	6

OR

10. a)	Derive an expression for electrostatic stress of an underground cable and also the condition for most economical operation of cable.	7M	5	5
b)	Develop the mathematical relations of insulation resistance and capacitance of single core cable.	7M	5	6

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III B.Tech. I Semester Supplementary Examinations March/April 2023

Power Electronics

(Electrical and Electronics Engineering)

Max. Marks: 70   Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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			Marks	CO	BL

UNIT–I

1.	What is meant by commutation of SCR and Explain any two commutation methods of SCR.	14M	1	4

OR

2. a)	With neat circuit diagram and waveforms explain the operation of RC firing circuit.	7M	1	2
b)	Explain about the Dynamic turn on Characteristics of SCR with wave forms	7M	1	2

UNIT–II

3.	Discuss causes of over voltages and over currents its protection methods.	14M	2	4

OR

4.	Describe the design procedure of a Snubber circuit.	14M	2	6

UNIT–III

5.	Describe the operation of three phase semi converter with R load and also draw the output voltage waveforms	14M	3	2

OR

6.	A single phase bridge converter is utilized to produce regulated DC output voltage. The input voltage is 230 V and the load current is 8A for a firing angle of 30°. (a) Calculate the dc output voltage. (b) Calculate the dc output voltage and current if a freewheeling diode is used at the output for the same firing angle.	14M	3	3

UNIT–IV

7.	Explain with neat circuit diagram and waveforms the working of two quadrant chopper for current reversal.	14M	4	3

OR

8.	Explain the control strategies of a chopper operation.	14M	4	2

UNIT–V

9.	Draw and explain single phase full wave regulator for RL load with neat circuit diagram and necessary waveforms.	14M	5	3

OR

10.	Design a single phase to single phase step down cyclo converter with centre – tapped transformer configuration and also explain the operation with output voltage waveforms.	14M	5	6

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Code: 7G251

R-17

III B.Tech. I Semester Supplementary Examinations March/April 2023
AC Machines-II
(Electrical and Electronics Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
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		Marks	CO	BL

UNIT–I

1. a) List the factors affecting alternator size — 7M | 1 | L1

   b) What are the principal advantages of rotating field system type of construction of synchronous machines? — 7M | 1 | L1

OR

2. a) What are the factors affecting the terminal voltage of the alternator — 7M | 4 | L1

   b) A 3-phase 16 pole alternator has a star connected winding with 144 slots and 10 conductors per slot. The flux per pole is 0.03 web, sinusoidally distributed and the speed is 375 rpm. Find the frequency, phase and line emf. Assume full pitched coil. — 7M | 3 | L3

UNIT–II

3. a) What is armature reaction? Explain the effect of armature reaction on the terminal voltage of an alternator at (i) unity power factor load (ii) zero leading power factor load. — 7M | 1 | L2

   b) Write a short note on armature resistance, synchronous reactance and impedance. — 7M | 1 | L1

OR

4. a) With a neat circuit diagram explain the procedure to conduct slip test for determination of Xd and Xq. — 7M | 1 | L2

   b) Define short circuit ratio and explain its significance in the operation of alternators — 7M | 4 | L1, L2

UNIT–III

5. a) With relevant equations, explain the load sharing procedure when two alternators are connected in parallel. — 7M | 2 | L2

   b) Two similar single-phase alternators are running in parallel. Their EMF's are 100V and 150V respectively and the impedance of each is (0.2+j1.0)   . Find the terminal voltage, current and power supplied by each machine to a load impedance of (2+j3)   . — 7M | 3 | L3

OR

6. a) Explain effect of change in mechanical power input on parallel operation of two alternators with neat diagrams. 7M 4 L2

   b) Two similar 400V, 3-ph alternators share equal kW power delivered to a balanced 3-ph 50 kW, 0.8 pf lag load. If the power factor of one is 0.95 lag, find the power factor and the current supplied by the other machine. 7M 3 L3

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UNIT–IV

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7. a) What is meant by Hunting in synchronous motors and how this effect can be suppressed? 7M 4 L1

   b) A 2300V 3-phase star connected synchronous motor has resistance of 0.2 ohm per phase and synchronous reactance of 2.2 ohm per phase. The motor is operating at 0.5 power factor leading with a line current of 200A. Determine the value of generated emf per phase. 7M 3 L3

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OR

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8. a) Explain the importance of 'V' and ' ' curves and with neat circuit diagram explain the experimental procedure to obtain the curves. 7M 4 L2

   b) A 2200 v, 3-phase, star connected synchronous motor has a resistance of 0.22   per phase and a synchronous reactance of 2.4   per phase. The motor is operating with 0.6 pf leading with a line current of 180 A. Determine the value of generated EMF per phase. 7M 3 L3

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UNIT–V

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9. a) Why the single-phase induction motor is not self-starting? Explain 7M 4 L2

   b) Draw and explain the torque – speed characteristics of single-phase induction motor based on the concept of double field revolving theory. 7M 4 L4

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OR

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10. a) With a neat connection diagram explain the construction and working of Hysteresis motor 7M 1 L2

   b) Explain the construction and working principle of Resistance Split-phase motor. 7M 1 L2

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