Hall Ticket Number :										

R-17

Code: 7GC51

III B.Tech. I Semester Supplementary Examinations February 2022

Environmental Science

(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

UNIT–I

1. a) Define environment. Discuss briefly the importance of environment. 7M
   b) List out different branches of science having close relationship with environmental studies. 7M

OR

2. a) Differentiate between the atmosphere and hydrosphere. 7M
   b) Outline the major causes for environmental degradation. 7M

UNIT–II

3. Describe the environmental problems associated with extraction of mineral resources. 14M

OR

4. a) Categorize the types of natural resources. 7M
   b) Discuss the importance of water as a natural resource. 7M

UNIT–III

5. a) Summarize the characteristic of forest ecosystem. 7M
   b) Explain the concept of food chain. 7M

OR

6. a) With a neat sketch, explain how the element carbon is recycled in nature. 7M
   b) Discuss the hot spots of India. 7M

UNIT–IV

7. a) Discuss the major effects of thermal pollution. 7M
   b) Describe the various control measures of soil pollution. 7M

OR

8. a) Describe the sources of water pollution. 7M
   b) Summarize the effects of radiation pollution. 7M

UNIT–V

9. a) Summarize the salient features of wild life protection act. 7M
   b) Discuss the effects of population explosion. 7M

OR

10. a) Describe the objectives of family welfare programmes. 7M
    b) Briefly discuss HIV/AIDS, mode of its spread and its effect on human health. 7M

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Hall Ticket Number :										

R-17

Code: 7G254

III B.Tech. I Semester Supplementary Examinations February 2022

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	Blooms Level
		UNIT–I			
1.	a)	Describe the constructional details of an SCR with the help of schematic diagram and the circuit symbol.	7M	1	2
	b)	Explain the various turn-on methods of SCRs.	7M	1	2
		OR			
2.	a)	Calculate the number of SCRs each with rating of 500 V ,75A required in each branch of a series and parallel combination for a circuit with the total voltage and current rating of 7.5KV and 1000A. Assume derating factor of 14%.	7M	1	3
	b)	Explain briefly parallel connection of SCRs.	7M	1	3
		UNIT–II			
3.		Explain briefly the specifications and ratings of SCRs.	14M	2	2
		OR			
4.	a)	Discuss about over voltage protection by metal oxide varistors.	7M	2	4
	b)	Analyze the cooling mechanism and mounting of thyristors.	7M	2	4
		UNIT–III			
5.	a)	Explain the operating principle of single phase half wave controlled rectifier with ‘R’ load.	7M	3	2
	b)	Summarize the role of freewheeling diode in converters.	7M	3	2
		OR			
6.	a)	Explain the operation of single phase fully controlled bridge rectifier with ‘RL’ load with neat circuit diagram and necessary waveforms.	7M	3	3
	b)	A two pulse converter is fed with a 230V, 50 Hz supply. The load on the converter is a pure resistance of R=10 Ω. Obtain the average output voltage for a firing angle of α =135°	7M	3	3
		UNIT–IV			
7.		Define a dc chopper? Describe the various types of chopper configurations briefly with necessary sketches.	14M	4	2
		OR			
8.		With a neat circuit diagram, explain the operation of buck converter. Draw the load voltage and load current waveforms and derive the expression for the output voltage.	14M	4	3
		UNIT–V			
9.		Differentiate CSI and VSI.	14M	5	2
		OR			
10.		Analyze series inverter with neat circuit diagram and waveforms.	14M	5	4

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Hall Ticket Number :										

R-17

Code: 7G251

III B.Tech. I Semester Supplementary Examinations Jan/Feb 2022

AC Machines-II

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Derive the EMF equation of Alternator 7M

   b) A 3 phase, 6 pole, star-connected alternator revolves at 1000 r.p.m. The stator has 90 slots and 8 conductors per slot. The flux per pole is 0.05wb (sinusoidally distributed). Calculate the voltage generated by the machine if the winding factor is 0.96. 7M

OR

2. a) Compare salient pole rotor and non-salient pole rotor of synchronous generator 7M

   b) Distinguish between (i) Integral slot and fractional slot windings (ii) concentrated and distributed windings. 7M

UNIT–II

3. a) What is synchronous impedance? How do you calculate synchronous impedance experimentally? 7M

   b) A 100 kVA, 3000V, 50Hz 3-phase star connected alternator has effective armature resistance of 0.2 ohms. The field current of 40 A produce short-circuit current of 200 A and an open circuit e.m.f of 1040 V (line). Calculate the full load voltage regulation at 0.8 lagging and 0.8 leading power factors. Draw phasor diagrams 7M

OR

4. a) Discuss Blondel's tworeaction theory applicable to salient pole synchronous generator. 7M

   b) A salient pole alternator has d-axis and q-axis reactance of 0.8pu and 0.5pu respectively. The effective resistance is 0.02pu. Compute percentage regulation when the generator is delivering rated load at 08 p.f lead. 7M

UNIT–III

5. a) Discuss the operation of synchronous generator connected to infinite bus with necessary equations. 7M

   b) A 2200 V, 50 Hz, 3 phase, star connected alternator has an effective resistance of 0.5 ohm per phase. A field current of 30 A produced the full-load current of 200 A on short circuit and a line-to-line emf of 1100V on open circuit. Determine the power angle of the alternator when it delivers full load at 0.8 lagging p.f. 7M

OR

6. a) Discuss the effect of change in excitation on parallel operation of two alternators. 7M

   b) Two alternators working in parallel supply a lighting load of 3000KW and a motor load aggregating to 5000KW at 0.72 pf. One machine is loaded up to 5000KW at 0.8 pf lagging. What is the load and power factor of the other machine? 7M

UNIT–IV

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

   b) A 2200 v, 3-phase, star connected synchronous motor has a resistance of 0.22 Ω per phase and a synchronous reactance of 2.4 Ω 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

OR

8. a) Discuss the various starting methods of synchronous motor 7M

   b) A 2000 V, 3- phase, star connected synchronous motor has an effective resistance and synchronous reactance of 0.2Ω and 2.2Ω per phase respectively. The input is 800 kW at normal voltage and the induced line emf is 2500 V. Calculate the line current and power factor. 7M

UNIT–V

9. a) Explain the operation and characteristics of universal motor 7M

   b) List the applications of the universal motor 7M

OR

10. a) What is a Repulsion motor? With a connection diagram explain its operation 7M

    b) Draw the speed torque characteristics of Repulsion motor and list the applications of repulsion motor 7M

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Hall Ticket Number :										

R-17

Code: 7G252

III B.Tech. I Semester Supplementary Examinations February 2022

Electrical and Electronic Measurements

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any *five full* questions by choosing one question from each unit (5 x 14 = 70Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Briefly explain characteristics of measuring instruments?	7M	1	1
	b)	Describe how a potential divider arrangement is used for multipliers used for multi range voltmeters. Derive expressions for resistance of different sections for a 4 range voltmeter?	7M	1	3
		OR			
2.	a)	Describe the constructional details of an attraction type moving iron instrument with the help of a neat diagram. Derive the expression for deflection if spring control is used and comment upon the shape of the scale?	10M	1	3
	b)	Define limiting errors. Derive the expression for relative limiting error?	4M	1	2
		UNIT–II			
3.	a)	Describe a circuit for testing of a single phase induction type energy meter at different loads and power factors?	7M	2	2
	b)	In a dynamometer wattmeter the moving coil has 500 turns of mean diameter 30 mm. Estimate the torque if the area of the field and the moving coils are at (i) 60^0 (ii) 90^0 when the flux density produced by field coils is 15 X 10^{-3} Wb/m^2, the current in moving coil is 0.05 A and the power factor is 0.866.	7M	2	3
		OR			
4.	a)	Explain the special features incorporated in an electrodynamometer type of wattmeter so that it can be used for low power factor applications?	10M	2	2
	b)	Explain about Creeping error in single phase induction type energy meter	4M	2	3
		UNIT–III			
5.	a)	Draw the circuit diagram of a Crompton's potentiometer and explain its working. Describe the steps used when measuring an unknown resistance?	7M	2	2

	b)	Describe the design and constructional features used in potential transformers for reduction of ratio and phase angle errors.	7M	2	2

OR

6.	a)	Describe the construction and working of a coordinate type a.c. potentiometer. How is it standardized? Explain how an unknown voltage measured with it.	7M	2	2
	b)	Explain in detail the effect of opening the secondary circuit of a current transformer when the primary winding is energized?	7M	2	2

UNIT–IV

7.	a)	Draw the circuit of a Wheatstone bridge and derive the conditions of balance.	7M	3	2
	b)	Explain how Wien's bridge can be used for experimental determination of frequency. Derive the expression for frequency in terms of bridge parameters.	7M	3	2

OR

8.	a)	What are the different difficulties encountered in the measurement of high resistance? Explain how these difficulties are overcome.	7M	3	2
	b)	Derive the equation of balance for an Anderson's bridge. Draw the phasor diagram for conditions under balance.	7M	3	2

UNIT–V

9.	a)	What are the different types of amplifiers used for CROs? Describe the basis on which they are classified.	7M	4	2
	b)	Draw a basic circuit of a digital frequency meter using various sections. Explain the functions of each section.	7M	4	2

OR

10.	a)	Describe how the following measurements can be made with the use of a CRO: (i) Frequency (ii) Phase angle	10M	4	2
	b)	List out the advantages and disadvantages of smart energy meters.	4M	4	2

END

Hall Ticket Number :										

R-17

Code: 7G253

III B.Tech. I Semester Supplementary Examinations February 2022

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	Blooms Level
		UNIT–I			
1.		Develop the expression for the Inductance per unit length of an overhead line from the basics of magnetic fields.	14M	1	6
		OR			
2.		Write Short notes on the following			
	a)	Geometric Mean Distance	3M	1	1
	b)	Geometric Mean Radius	2M	1	1
	c)	Transposition	6M	1	1
	b)	Bundling of Conductors	3M	1	1
		UNIT–II			
3.	a)	Derive the approximate voltage regulation expression for short transmission line.	8M	2	5
	b)	Evaluate ABCD constants for Short Transmission line	6M	2	5
		OR			
4.	a)	Discuss in detail the nominal-π representation with neat circuit diagram and phasor diagram. Derive also its performance specifications.	14M	2	2
		UNIT–III			
5.		Determine the relation between sending end parameters and receiving end parameters of a long transmission line using rigorous solution.	14M	2	5
		OR			
6.	a)	What is surge impedance? Define Surge Impedance loading? What is the relation of SIL with Ferranti effect?	6M	2	1
	b)	A 800KV transmission line is having per phase line inductance of 1.1mH/km and per phase line capacitance of 11.68nF/km. Ignoring the length of line, what is the surge impedance loading of the line.	8M	2	3
		UNIT–IV			
7.	a)	Give a mathematical analysis to show the velocity of propagation of wave depends on the inductance and capacitance of the line	8M	3	2
	b)	Derive the transmission and reflection coefficients for voltage and currents of a line of impedance ‘Z’ is terminated by a resistor of value ‘R’.	6M	3	3
		OR			
8.	a)	Define the following i) Reflection ii) Refraction iii) Attenuation iv)Distortion	7M	3	1
	b)	Explain the phenomenon of wave travelling from sending end to receiving end.	7M	3	2
		UNIT–V			
9.		Give an elaborate discussion on types of insulating materials used for UGC and different varieties of Underground Cables.	14M	5	6
		OR			
10.	a)	Find the Voltage distribution of 5 disc insulator string and prove that voltage distribution is not uniform.	8M	4	1
	b)	What is the effect of non-uniform voltage distribution on string efficiency? Explain with an illustration of 5 disc insulator string.	6M	4	3

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