Code: 7G252

R-17

III B.Tech. I Semester Supplementary Examinations June 2022
Electrical and Electronics Measurements
(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) Explain the basic characteristics of an instrument
   b) List and define different forces required to operate an instrument

OR

2. Explain in detail the different methods to produce Deflecting, Controlling forces

UNIT–II

3. a) Define the terms Power, Power Factor and Energy
   b) What is the purpose of copper shaded bands in an Energy Meter

OR

4. Explain the construction and working principle of single phase dynamometer type power factor meter. Derive the expression for torque

UNIT–III

5. Explain the construction and working principle of basic potentiometer circuit

OR

6. a) Classify the types of frequency meters
   b) Illustrate the working of Weston type frequency meter with diagram

UNIT–IV

7. a) Classify the resistances based on their values and number of terminals
   b) What are the different methods present to measure the medium and high valued resistances

OR

8. Determine the unknown inductance using Anderson's Bridge and list out the various advantages and disadvantages of the bridge with its phasor diagram

UNIT–V

9. a) List out the advantages of Digital meters over Analog meters
   b) How do you measure the voltage, current and time period using CRO

OR

10. Draw a neat labeled diagram of Cathode Ray Tube and explain its functioning
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III B.Tech. I Semester Supplementary Examinations June 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

UNIT–I

1. a) Derive the capacitance of a 1- two wire line   7M

   b) A 3- OHTL has its conductors arranged at the corners of an equilateral triangle of 2 meters aside. Calculate the capacitance/km/ph. Assume that radius of each conductor is 0.5cm.   7M

OR

2. The horizontally placed conductors of a 1- line operating at 50Hz are having outside diameter of 1.6cm and the spacing between centers of the conductors is 6m. The permittivity of free space is 8.854 x 10^{-12} F/m. Determine the capacitance to ground per km of each line.   14M

UNIT–II

3. a) Derive the approximate voltage regulation expression for short transmission line.   8M

   b) Evaluate ABCD constants for Short Transmission line   6M

OR

4. Explain in detail about the short and medium lines   14M

UNIT–III

5. Discuss in detail the following

   a) Skin Effect   5M

   b) Proximity Effect   5M

   c) Charging Current   4M

OR

6. Determine the sending end voltage, current, power and power factor of a 160km length 3- long transmission line delivering 50MVA at 132 KV and 0.8pf lagging. Also find the efficiency and regulation of the line. Resistance per line 0.1557 ohm per km, spacing 3.7m, 6.475m, and 7.4m transposed and diameter 1.956cm.   14M

UNIT–IV

7. Prove that the sum of incident wave and reflected wave is equal to transmitted wave for voltages and currents.   14M

OR

8. a) Explain the phenomenon of corona in EHV lines?   6M

   b) What are the factors affecting corona and explain in detail.   8M

UNIT–V

9. Explain with neat sketch the construction of Underground Cable?   14M

OR

10. Each conductor of a 33KV, 3- system is suspended by a string of three similar insulators. The ratio of shunt capacitance to self-capacitance is 0.1. Determine the voltage distribution across the string and percentage String efficiency.   14M

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III B.Tech. I Semester Supplementary Examinations June 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)	Summarize the need for public awareness about environment.	7M
b)	Describe the four conceptual spheres in the earth's environment.	7M

OR

2. a)	Discuss the salient features of environment.	7M
b)	List out the preventive measures of environmental degradation.	7M

UNIT–II

3. a)	Explain the effects of floods.	7M
b)	Discuss the uses of forest.	7M

OR

4.	Discuss the merits and demerits of traditional agriculture and modern agriculture.	14M

UNIT–III

5. a)	Explain in detail the different components of ecosystem.	7M
b)	Illustrate the food web.	7M

OR

6.	Describe the concept of ecosystem and explain the relationship among its different parts using a schematic diagram.	14M

UNIT–IV

7. a)	Discuss the hazardous effects of soil pollution.	7M
b)	Define pollution. Explain the effects of environmental pollution.	7M

OR

8. a)	Discuss the requirement of a no polluted environment.	7M
b)	Explain the natural and man-made pollutants that cause environmental pollution.	7M

UNIT–V

9. a)	Discuss the salient provisions of environmental protection act.	7M
b)	Discuss the importance of environmental value education.	7M

OR

10.	Explain the importance of control of global warming in the preservation and protection of environment.	14M

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R-17

Code: 7G254

III B.Tech. I Semester Supplementary Examinations June 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

UNIT–I

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

OR

2. a) Draw and explain the turnoff characteristics of SCR.   7M
   b) Explain the triggering circuit suitable for firing angle control greater than 90°   7M

UNIT–II

3. Explain the two transistor analogy of an SCR.   14M

OR

4. a) Discuss dv/dt protection of SCR with snubber circuit.   7M
   b) Explain in detail gate protection of SCR with neat sketch   7M

UNIT–III

5. A single phase full converter is connected with R-load. The source voltage is 230 V 50 Hz. The average load current is 10A. For R=20   find the firing angle.   14M

OR

6. Explain the operation of single phase full wave controlled rectifier with 'R' load with neat circuit diagram and necessary waveforms   14M

UNIT–IV

7. Explain the control strategies of a chopper operation.   14M

OR

8. A step down DC chopper has input voltage of a 230V with 10 Ohms load resistor connected, For duty cycle of 0.5. Calculate average value of output voltage.   14M

UNIT–V

9. Explain pulse width modulation techniques.   14M

OR

10. a) Explain the operation of 1-Φ bridge configuration of cyclo converter with resistive load.   7M
    b) Explain the operation of full wave AC voltage controller with RL load.   7M

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III B.Tech. I Semester Supplementary Examinations June 2022
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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UNIT–I

1. a) Compare salient pole rotor and non-salient pole rotor of synchronous generator
   b) Distinguish between (i) Integral slot and fractional slot windings (ii) concentrated and distributed windings.

OR

2. a) Derive the EMF equation of Alternator
   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.

UNIT–II

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

OR

4. a) Discuss Blondel's two reaction theory applicable to salient pole synchronous generator.
   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.

UNIT–III

5. a) Discuss the operation of synchronous generator connected to infinite bus with necessary equations.
   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 1100 V on open circuit. Determine the power angle of the alternator when it delivers full load at 0.8 lagging p.f.

OR

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

UNIT–IV

7. a) Discuss the various starting methods of synchronous motor
   b) A 2000 V, 3- phase, star connected synchronous motor has an effective resistance and synchronous reactance of 0.2   and 2.2   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.

OR

8. a) Explain excitation and power circles of a synchronous motor
   b) A synchronous motor absorbing 60 kW is connected in parallel with a factory load of 240 kW having a lagging power factor of 0.8. If the connected load has a power factor of 0.9 lagging. What is the leading kVAR supplied by the motor and at what power factor the motor is operating.

UNIT–V

9. a) Explain the operation and characteristics of universal motor
   b) List the applications of the universal motor

OR

10. a) Explain the construction and working principle of Schrage motor
    b) A universal series motor has a resistance of 30   and an inductance of 0.5 H. When connected to a 250V dc supply and loaded to take 0.8 A it runs at 2000 rpm. Determine the speed, torque and power factor when connected to a 250V, 50 Hz, ac supply and loaded to take the same current.

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