Hall Ticket Number :										

R-15

Code: 5G251

III B.Tech. I Semester Supplementary Examinations November 2019

Electrical Machines-III

(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) Compare the salient features of projecting pole rotor and round rotor. 7M

   b) Find the pitch factor for the winding of 36 slots, 4 poles, coil span 1 to 8. 7M

OR

2. a) Explain how the harmonics in the generated EMF can be suppressed in synchronous machines. 6M

   b) A 3-Ph, 50 Hz, 8 pole alternator has a star connected winding with 120 slots and 8 conductors/slot. The flux per pole is 0.05wb, sinusoidally distributed. Determine the phase and line voltages. Let the winding factor as 0.956. 8M

UNIT–II

3. a) Write a short note on armature winding terminology. 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

OR

4. a) Explain the method of determining Xd and Xq (slip test) of a salient pole synchronous machine. 7M

   b) A 3 ph y connected, 1000KVA, 11KV alternator has rated current of 52.5A. The ac resistance of the winding is 0.45 Ω/ph. The test results are given as

   OC test: I_f = 12.5A, voltage between lines = 422V

   SC test: I_f = 12.5A, line current = 52.5A

   Compute the synchronous reactance per phase. 7M

UNIT–III

5. a) Discuss the need for connecting the alternators in parallel. Mention the conditions for parallel operation of alternators. 7M

   b) Two similar turbo alternators are rated at 25MW each. They are running in parallel. The speed-load curves of the driving turbines are such that the frequency of alternator-1 drops uniformly from 50Hz no load to 48Hz on full load and that alternator-2 from 50Hz to 48.5Hz. How will the two machines share a load of 30MW. 7M

OR

6. Two single phase alternators operate in parallel and supply a load impedance of (3+j4) Ω/ph. If the impedance is (0.2 + j2) Ω/ph, e.m.f.s are (220 + j0)V, determine (i) Terminal voltage, (ii) p.f and output power of each machine. 14M

UNIT–IV

7. a) Name the different starting methods of synchronous motor, explain how the synchronous motor can start with help of damper winding. 7M

   b) State the main features of synchronous motor. Mention its applications. 7M

OR

8. a) Explain why the 3 – Ph synchronous motor is not a self starting motor? 7M

   b) A 3 ph, 6600V, Y connected synchronous motor delivers 500KW power to a load. Its full load efficiency is 83%. Let R_a = 0.3 Ω/ph and X_s = 3.2 Ω/ph. Find the generated e.m.f and load angle when the machine is operating with 0.8 leading p.f. 7M

UNIT–V

9. a) Discuss in detail about the working principle of split phase motor with neat diagram. 7M

   b) Explain in detail about double revolving field theory. 7M

OR

10. Compare the AC series motor with Universal motor and mention their operational difficulties. 14M

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Hall Ticket Number :										

R-15

Code: 5G252

III B.Tech. I Semester Supplementary Examinations November 2019

Transmission of Electric Power

(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 expression for the inductance of a 3- phase line which is completely transposed. 6M

   b) A single circuit 3- phase line operating at 50 Hz has a conductor diameter of 5.18 mm. The spacing between the line conductors is given in metre. Dry=3.2; Dyb = 4.0; Dbr = 5.0. Calculate the inductance and inductive reactance per phase per km. 8M

OR

2. a) Derive the expression for capacitance of a 3- phase overhead line with unsymmetrical spacing. 8M

   b) Find out the capacitance of a single-phase line 30 km long consisting of two parallel wires each 15 mm diameter and 1.5 m apart. 6M

UNIT–II

3. a) Draw the phasor diagram of a short transmission line and derive an expression for voltage regulation. 7M

   b) A 3-phase 50 Hz transmission line has resistance, inductance and capacitance per phase of 10 Ω, 0.1 H, and 0.9 μF and delivers a load of 35MW at 132 kV and 0.8 pf lag. Determine the efficiency and regulation of the line using nominal-T method. 7M

OR

4. a) Derive A, B, C, D constants of a medium length transmission line and hence prove that AD – BC = 1. 7M

   b) Find the A, B, C, D parameters of a 3- phase , 80 km, 50 Hz transmission line with series impedance of (0.15+j 0.78) ohm per km and a shunt admittance of $j5x10^{-6}\ mho$ per km. 7M

UNIT–III

5. a) Explain about the equivalent 'π 'model of a long transmission line? 6M

   b) A 3 phase 200km long transmission line has the following constants. Resistance /ph/km is 0.15ohm, reactance/ph/km is 0.22 ohms, and the shunt admittance/ph/km is 1.4*10-6 mho. Calculate by rigorous method the sending end voltage and current when the line is delivering a load of 20MW at 0.75 lagging power factor. The receiving end voltage is 110kv?. 8M

OR

6. a) Using rigorous method derive expressions for sending-end voltage and current for long transmission line. 7M

   b) Find the A,B,C,D parameters of a 3-phase, 80km, 50Hz transmission line with series impedance of (0.15+J0.78) ohm per km and a shunt admittance of J5×10-6 mho per km. 7M

UNIT–IV

7. a) Discuss the phenomenon of wave reflection and refraction. 7M

   b) A surge of 10 kV travels along the cable towards its junction with an overhead line. The surge impedances of the cable and the line are 50 Ω and 450 Ω respectively. Determine the surge voltage transmitted into the overhead line. 7M

OR

8. a) Explain the factors that affect the corona loss on an overhead transmission line. 6M

   b) Find the disruptive critical voltage and visual corona voltage for a grid of line operating at 132 kV. The line consisting of 1.96 cm diameter conductors spaced 3.81 meters apart. The following data can be considered. Temperature 440 c, barometric Pressure 73.7 cm of mercury, conductor surface factor 0.84, fine weather 0.8, rough weather 0.66. 8M

UNIT–V

9. a) Derive the expression for sag when the supports are at equal heights. 7M

   b) A transmission line conductor has an effective diameter of 19.5 mm and weighs 1.0 kg/m. If the maximum permissible sag with a horizontal wind pressure of 39kg/m2 of projected area and 12.7 mm radial ice coating is 6.3m. Calculate the permissible span between two supports at the same level allowing a safety factor of 2. Finally, strength of the conductors is 800kg and weight of ice is 910kg/m3. 7M

OR

10. a) What are the different types of grading of cables? Explain each. 7M

    b) The capacitance of three core cable belted type is measured and found to be as follows:

       i) Capacitance between three cores bunched together and to the sheath is 7.5 μF.
       ii) Capacitance between the conductor and the other two connected together to the sheath is 4.5 μF.

       Calculate the capacitance to neutral and total charging kVA when the cable is connected to a 11 kV, 50 Hz, three phase supply 7M

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Hall Ticket Number :										

R-15

Code: 5GC53

III B.Tech. I Semester Supplementary Examinations November 2019

Environmental Science

(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) Define environment? Explain the importance of Environmental studies. 7M

   b) Describe the role of public institutions in bringing Public awareness? 7M

OR

2. a) Compile the global environmental issues? 7M

   b) Explain the people role in environment? 7M

UNIT–II

3. a) Summarize the effects of dams on forest and tribal people? 7M

   b) Examine the causes of deforestation? 7M

OR

4. Describe the renewable and nonrenewable energy resources? Compare the properties and their role in environment? 14M

UNIT–III

5. a) Explain the structure and function of forest ecosystem? 7M

   b) Explain i)Food chain ii) Carbon cycle 7M

OR

6. a) Explain the threats to biodiversity? 7M

   b) Outline the biodiversity conservation methods? 7M

UNIT–IV

7. a) What are the causes and effects of Air pollution? 7M

   b) Summarize the noise pollution control methods? 7M

OR

8. a) What are the control measures of marine pollution? 7M

   b) Describe the nuclear hazards? 7M

UNIT–V

9. a) List out the causes and effects of Global warming? 7M

   b) Explain i) Environmental ethics ii) Rain water harvesting. 7M

OR

10. a) Summarize the water act? 7M

    b) Explain the measures to mitigate the population growth? 7M

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Hall Ticket Number :										

R-15

Code: 5G359

III B.Tech. I Semester Supplementary Examinations November 2019

Linear and Digital Integrated Circuits Applications

(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) Explain the operation of inverting and non-inverting operational amplifier. 8M

   b) With a neat sketch explain the operation of difference amplifier. 6M

OR

2. Discuss the DC characteristics of an OP amp 14M

UNIT–II

3. a) Explain the various DAC and ADC specifications in detail. 8M

   b) Determine the resolution of 8-bit ADC for 15V input. 6M

OR

4. a) Design a ramp generator using 555 timer having an output frequency of approximately 5 KHz. 8M

   b) Write a detailed note on any two applications of 555 timer in monostable mode. 6M

UNIT–III

5. a) Write a short note on MOS transistors. 6M

   b) Draw the 2-input OR gate using diode logic and explain its operation using truth table. 8M

OR

6. a) Draw the circuit for 2 input TTL NAND gate and explain operation with the help of truth table. 10M

   b) Explain low voltage CMOS logic 4M

UNIT–IV

7. a) Explain the operation of parity circuits. 7M

   b) What is the necessity of tri-state buffers? 7M

OR

8. Examine the function of priority encoder with truth table. And draw pin diagram and logic diagram of IC 74X148 14M

UNIT–V

9. Draw pin and logic diagrams of IC 74X198 and give a detailed operation. 14M

OR

10. Develop a synchronous modulo-16 UP/DOWN counter using J-K Flip flop 14M

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Hall Ticket Number :										

R-15

Code: 5G253

III B.Tech. I Semester Supplementary Examinations November 2019

Power Electronics

(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) Discuss about switching characteristics of an SCR during turn on and off. 7M

   b) Explain various turn-on methods of an SCR. 7M

OR

2. a) Explain the static V-I characteristics of a thyristors and different modes of operation. 7M

   b) Explain the series and parallel connections of the SCRs? 7M

UNIT–II

3. a) Explain the specifications and ratings of the SCR's and how the protection against the dv/dt taken place with design of the snubber circuit? 7M

   b) For the circuit shown in the Fig.1

   i) Calculate the maximum values of the di/dt and dv/dt of the SCR.

   ii) find the rms and average current ratings of the SCR for the firing angle delays of 90 and 150 degrees

   iii) Suggest the rated voltage of the SCR?

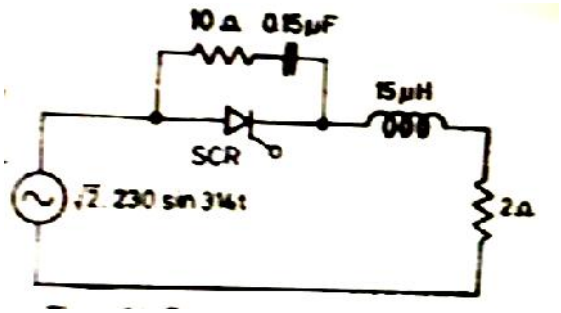

Fig.1 7M

OR

4. a) Explain the over current protection of the circuit by using current limiting fuses? 7M

   b) Write short notes on the cooling and mounting of thyristors? 7M

UNIT–III

5. Describe the working of three phase fully controlled converter and derive the expressions for average output voltage and rms output voltage 14M

OR

6. a) Describe the principle and operation of the six pulse midpoint converter with RL loads? 7M

   b) A single-phase full converter has a RL load having L = 6.5 mH, R = 0.5Ω and E = 10 V. The input voltage is Vs= 120 V at (r.m.s) 60Hz. Determine: (i) The average thyristor current Ia. (ii) r.m.s thyristror current IR.(iii) The average output current Idc. 7M

UNIT–IV

7. a) Explain the principle of operation for buck boost converter under RLE load? 7M

   b) Write short notes on the

   (i) Time ratio control

   (ii) Ripple current

   (iii) Ripple factor 7M

OR

8. a) Discuss the principle of operation of DC-DC step down chopper with suitable waveforms 7M

   b) A step-up chopper has an input voltage of 150V. The voltage output needed is 450V. Given that thyristror has a conducting time of 150 μseconds. Calculate the chopping frequency 7M

UNIT–V

9. a) Describe the operation of single phase full wave AC voltage controller feeding RL load with relevant waveforms. 7M

   b) A single phase AC voltage controller has a resistive load of R=10 ohms and the input voltage is Vs = 120V, 60Hz. The delay angle of thyristor is 90 degrees. Determine:

   (i) The r.m.s value of output voltage V_o

   (ii) The input power factor.

   (iii) The average input current. 7M

OR

10. a) Explain the operation of single phase bridge configuration of cyclo converter with continuous load current. 7M

    b) What are the different PWM techniques employed for inverter? Explain sinusoidal PWM technique with neat wave forms. 7M

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Hall Ticket Number :										

R-15

Code: 5G254

III B.Tech. I Semester Supplementary Examinations November 2019

Electrical and Electronics Measurements

(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) Errors in measurements can be classified as (i) Gross errors (ii) Systematic errors (iii) Random errors.

   Explain these errors by giving suitable examples. Discuss the mean adopted to minimize these errors? 12M

   b) A certain resistor has a voltage drop of 110.2 V and a current of 5.3 A. The uncertainties in the measurements are: ± 0.2 V and ±0.06 A respectively. Calculate the power dissipated in the resistor and the uncertainty in power? 2M

OR

2. Explain the working of (i) attraction type and (ii) repulsion type of moving iron instruments with the help of neat diagrams. Describe the methods of producing controlling and damping torques in them. Explain why these meters can be used on both a.c. and d.c. 14M

UNIT–II

3. a) Explain the special features incorporated in an electrodynamometer type of wattmeter so that it can be used for low power factor applications? 7M

   b) A 3 phase 500 V motor load has a power factor of 0.4. Two wattmeter's connected to measure the input. They show the input to be 30 KW. Find the reading of each instrument? 7M

OR

4. a) Explain the sources of errors in single phase induction type Energy meters? 7M

   b) The following readings are obtained for one month of 30 days,

   KVAhr meter=38,830, KWh meter = 291,940. Demand indicator = 1400 KW. Find out the average monthly load factor and power factor? 7M

UNIT–III

5. a) Explain the construction and working of Weston type frequency meter? 7M

   b) Explain the term 'standardization', of a potentiometer. Describe the procedure of standardization of a d.c. Potentiometer? 7M

OR

6. a) Draw the circuit diagram of a Crompton's potentiometer and explain its working. Describe the steps used when measuring an unknown resistance? 10M

   b) Calculate the inductance of a coil from the following measurement on a.c. potentiometer:

   Voltage drop across a 0.1Ω standard resistance connected in series with the coil = $0.613 \angle 12^0.6'$.

   Voltage across the test coil through a 100/1 volt-ratio box = $0.781 \angle 50^0.48'$ V. frequency is 50 Hz? 4M

UNIT–IV

7. a) Explain the loss of charge method for measurement of insulation resistance of cables? 7M

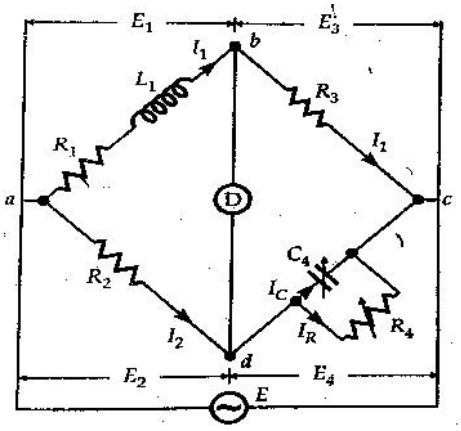
   b) Derive the expression for bridge sensitivity for a Wheatstone bridge with equal arms. Find also the expression for current through the galvanometer for a small unbalance? 7M

OR

8. a) Derive the equations of balance for an Anderson's bridge. Draw the phasor diagram for conditions under balance? Discuss the advantages and disadvantages of the bridge? 10M

   b) A Maxwell's capacitance bridge shown in fig is used to measure an unknown inductance in comparison with capacitance. The various values at balance, R_2= 400Ω; R_3=600Ω; R_4=1000Ω; C_4=0.5μF.

   Calculate the values of R_1 and L_1. Calculate also the value of storage factor of coil if frequency is 1000 Hz?



4M

UNIT–V

9. a) Derive the expression for vertical deflection of an electron beam in a CRT? 7M

   b) What are the different types of amplifiers used for CRO's? Describe the basis on which they are classified? 7M

OR

10. a) Explain the operation of successive approximation type digital voltmeter with the help of neat sketch? 10M

    b) Describe the following types of oscilloscopes (i) Dual trace type (ii) Dual beam type? 4M

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