Hall Ticket Number :										

R-17

Code: 7G252

III B.Tech. I Semester Regular 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

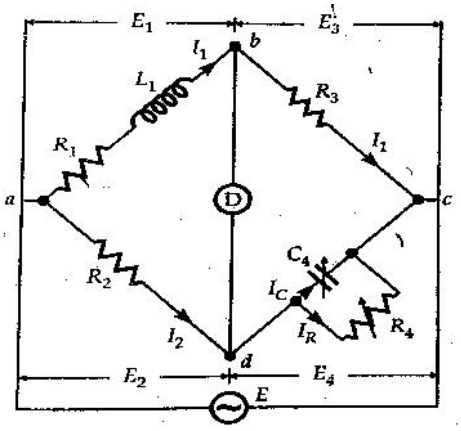
   b) Derive the expression for bridge sensitivity for a Wheatstone bridge with equal arms. Find also the expression for current through the galvanometer for a small unbalance? 7M

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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Hall Ticket Number :										

R-17

Code: 7G253

III B.Tech. I Semester Regular Examinations November 2019

Electric Power Transmission

(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-17

Code: 7GC51

III B.Tech. I Semester Regular 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-17

Code: 7G255

III B.Tech. I Semester Regular Examinations November 2019

Generation 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. Discuss about the various parts of components of thermal power station with neat diagram 14M

OR

2. Write a short note on super heaters, reheaters and condensors 14M

UNIT–II

3. a) What are the methods of producing nuclear reaction? What is chain reaction? 7M

   b) Explain the function of moderators used in Nuclear power station 7M

OR

4. Identify and explain the different parts from lay out of hydro generating station 14M

UNIT–III

5. Comparison between flat plate collector and focusing collectors 14M

OR

6. What are the design considerations of horizontal axial machines? Explain. 14M

UNIT–IV

7. a) Discuss about the methods of harnessing Geothermal energy. 7M

   b) Explain the principle of OTEC 7M

OR

8. With the help of neat diagrams, explain the working of biogas plants of floating type and fixed type systems. Discuss their relative merits and demerits. 14M

UNIT–V

9. Maximum demand of a generating station is 100 MW, a load factor is 65%. The plant capacity factor and plant use factor are 50% and 80%, respectively. Determine: (i) The maximum energy. (ii) Installed capacity of plant (iii) The reserve capacity of plant. (iv)The maximum energy that could be produced daily if the plant is running all the time. (v)The maximum energy that could be produced daily if the plant is running at full load (according to the operating schedule) and utilization factor. 14M

OR

10. What are the factors which influence the tariff design in an electric supply system? 14M

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Hall Ticket Number :										

R-17

Code: 7G254

III B.Tech. I Semester Regular 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?

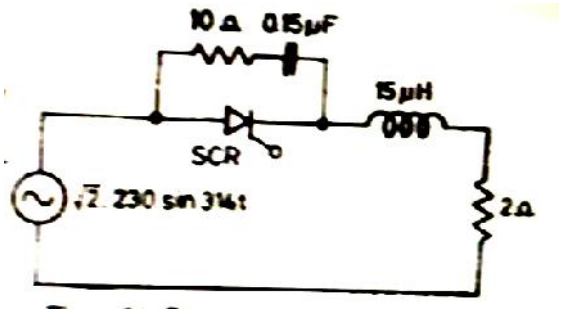

Fig.1 7M

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-17

Code: 7G251

III B.Tech. I Semester Regular Examinations November 2019

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) Explain the constructional details of rotor of both salient pole and cylindrical rotor synchronous machine. 7M

   b) Describe the various schemes used for exciting large synchronous machines justify which scheme is being preferred present days for exciting very large turbo generators. 7M

OR

2. a) Derive the EMF equation for a alternator from fundamentals showing clearly expressions for pitch factor and distribution factor. 7M

   b) A 3-phase, 4-pole, 24 slot alternator has its armature coils short pitched by one slot. Determine distribution and pitch factors. 7M

UNIT–II

3. a) Define the voltage regulation of an alternator and explain why does the armature terminal voltage change the alternator is loaded. 7M

   b) List out the methods of determining voltage regulations of an alternator and Explain A.S.A method with the schematic diagrams. 7M

OR

4. a) Explain how to determine the direct and quadrature axis synchronous reactance using slip test. 7M

   b) The effective resistance of a 3-phase, star-connected 50 HZ, 2200 V synchronous generator is 0.4 ohms per phase. On short circuit a field current of 45 A gives the full load current of 250 A. An E.M.F(line to line) of 1200 V is produced on open circuit with the same field current.

   (i) Determine the synchronous impedance.

   (ii) Compute voltage regulation when it is supplying full load with 0.8 lagging. 7M

UNIT–III

5. a) What is the need of parallel operation of synchronous generators and what are the different methods available for synchronization explain any one of them in brief. 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 1100 V 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) Explain effect of change in excitation on parallel operation of two alternators with neat diagrams. 7M

   b) A 2-pole, 50 Hz, 3 phase, turbo alternator is excited to generate the bus-bar voltage of 11 kV on no-load. The machine is star connected and the short circuit current for this excitation is 1000 A. Calculate the synchronizing power per degree of mechanical displacement of the rotor and the corresponding Synchronizing torque. 7M

UNIT–IV

7. a) Explain Why synchronous motor is not self-starting and list out the starting methods and explain any one of them . 7M

   b) A 440 V, 50 Hz, 3phase circuit takes 18 A at a lagging power factor of 0.8 .A synchronous motor is used to raise the power factor to unity. Calculate the kVA input to the motor and its power factor when driving a mechanical load of 6 kW. The motor has an efficiency of 85%. 7M

OR

8. a) List out the types of excitations and explain variations of current and power factor. 7M

   b) What is hunting how to suppress hunting in synchronous machines? 7M

UNIT–V

9. a) Explain the principle and operation of single phase induction motors with neat diagram and list out the applications 7M

   b) Explain construction and torque characters of capacitor-start and Run single phase induction motor with neat diagrams. 7M

OR

10. a) Explain the construction and principle of shaded pole induction motor and list out the applications. 7M

    b) Distinguish between hysteresis motor and repulsion motor explain in brief. 7M

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