Hall Ticket Number :										

R-14

Code: 4G254

III B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

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)

****

UNIT–I

1. a) Explain about controlling devices and damping devices used in indicating instruments.
   b) Explain the classification of moving coil instruments.

OR

2. a) Explain the various errors in PMMC instruments.
   b) Explain principle of operation of dynamometer type moving coil instrument.

UNIT–II

3. a) Explain principle and operation of power factor meter
   b) Explain Dynamometer type of single phase power factor meter

OR

4. a) Explain about Low power factor wattmeter
   b) Explain dynamometer meter type power factor meter for balanced 3-phase load

UNIT–III

5. a) Explain for the measurement of medium resistance using Ammeter-Voltmeter method
   b) Explain for the measurement of capacitance using De Sauty bridge method

OR

6. a) Explain for the measurement of inductance using Maxwell bridge method
   b) Explain for the measurement of frequency using Wien bridge method

UNIT–IV

7. a) Explain for the principle of operation of DC potentiometer for the measurement of current
   b) Explain the method to determine Hysteresis Loop

OR

8. a) Explain the method to measure flux and flux density
   b) Explain the method to measure the value of magnetizing force

UNIT–V

9. a) Explain the differences between horizontal and vertical amplifier
   b) What are Lissajous patterns

OR

10. a) Explain the principle of operation of Digital DMM
    b) Explain the purpose of Successive approximation in DVM

***

Hall Ticket Number :										

R-14

Code: 4G251

III B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

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)

****

UNIT–I

1. a) Discuss the constructional details of a salient pole synchronous machine with neat sketch. 7M

   b) A 3-phase Star connected Alternator driven at 900 rpm is required to generate a line voltage of 425 V at 60 Hz on open circuit. The stator has 3 slots per pole per phase and 4 conductors per slot. Assume full pitched coils. Calculate **i**) No. of poles **ii**) the useful flux per pole. Consider winding factors. 7M

OR

2. a) What are the advantages and disadvantages of short pitched and distributed winding in alternator? 7M

   b) Find the rms values of phase voltage for a 3-ph, 50 Hz, 6 pole 72 slot alternator having a double layer winding with 20 turns/coil. The coil span is 5/6 of pole pitch. The speed is 1000 rpm and flux per pole is 0.048 Wb. Find (**i**) frequency (**ii**) number of turns per phase (**iii**) emf per phase. 7M

UNIT–II

3. a) Describe a method to determine direct axis and quadrature axis reactances of a salient pole alternator. 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. The OC and SC test results for a 3-ph 50 Hz,6-pole 440 V,Y-connected alternator are as follows

I_f	2	4	6	7	8	10	12	14
Voc	156	288	396	440	474	530	568	592

A field current of 7 A is needed to circulate the full load rated armature current of 40A under short circuit conditions. The field current for rated terminal voltage under full load zero power conditions is 15 A. The armature resistance is 0.2 ohms/ph. Find the regulation at full load current of 40A at 0.8 lagging pf. Using (**i**) mmf method (**ii**) potier triangle method. And also comment on the results 14M

UNIT–III

5. a) What is synchronizing power and explain its role in load sharing during parallel operation? 7M

   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

OR

6. a) Discuss the effect of change in excitation and change in mechanical power input on the operation of an alternator on infinite bus? 7M

   b) Two 3-ph alternators are working in parallel with the following particulars:
   Alternator 1: Z1 = (0.2+j2) ohms/ph; E1 = (2000+j0) V/ph
   Alternator 2: Z2 = (0.2+j2) ohms/ph; E2 = (2200+j100) V/ph
   Load: ZL = (3+j4) ohms/ph. Determine the kW output and power factor of each alternator 7M

UNIT–IV

7. a) What is a synchronous condenser? Explain its operation. 7M

   b) A 400-V, 6-pole, 3-phase, 50 Hz, start connected synchronous motor has a resistance and synchronous reactance of 0.5 ohm and 4 ohm per phase respectively. It takes a current of 15 A at unity power factor when operating with a certain field current. If the load torque is increased until the line current is 60 A, the field current remaining unchanged, find the gross torque developed, and the new power factor. 7M

OR

8. a) Draw the phasor diagram of 3-phase synchronous motor. Explain the effect of (**i**) change in excitation if load is constant (**ii**) change of load if excitation is constant 7M

   b) Why synchronous motor is not a self-starting? Explain the starting methods of synchronous motors? 7M

UNIT–V

9. Show that a single phase winding when excited by a single phase supply produce two equal and opposite revolving fields. 14M

OR

10. a) Write short notes on synchronous induction motor. 7M

    b) Explain the role of compensating winding in the operation of AC series motor. 7M

***

Hall Ticket Number :										

R-14

Code: 4GC52

III B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

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)

****

UNIT–I

1. a) Explain the scope and importance of Environmental Studies? 7M
   b) Discuss the need for public awareness of environment? 7M

OR

2. a) Describe the various parts of the Environment? 7M
   b) Why it is important for people to know about the environment? 7M

UNIT–II

3. a) Explain the role of an individual in the conservation of natural resources? 7M
   b) Compare the features and effects of use of renewable and nonrenewable resources? 7M

OR

4. What is the difference between renewable and nonrenewable energy resources? Explain the role of alternate energy sources? 14M

UNIT–III

5. a) What is an ecosystem? Explain the structure and function of an ecosystem? 7M
   b) Explain the characteristics of a desert ecosystem? 7M

OR

6. a) Explain the values of a biodiversity? 7M
   b) What is a hotspot biodiversity? 7M

UNIT–IV

7. a) What are the causes and effects of Air pollution? 7M
   b) Explain the methods of control of noise pollution? 7M

OR

8. a) Summarize the soil pollution? 7M
   b) What are the causes and effects of Marine pollution? 7M

UNIT–V

9. a) Explain in detail about various rain water harvesting method? 7M
   b) What are the causes and effects of Acid rains and Ozone layer depletion*?* 7M

OR

10. a) Discuss the salient features of Water (Prevention and control of pollution) act-1974? 7M
    b) What is the impact on environment due to population growth? 7M

***

Hall Ticket Number :										

R-14

Code: 4G359

III B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

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)

****

UNIT–I

1. a) List the non ideal dc characteristics of an op-amp.
   b) Define slew rate. What causes the slew rate?

OR

2. a) Explain the difference between the integrator and differentiator and give one application of each.
   b) Draw the characteristics of an ideal comparator and that of a commercially available comparator.

UNIT–II

3. a) Draw and explain the functional diagram of a 555 timer
   b) Discuss some applications of timer in monostable mode.

OR

4. List and explain the applications of PLL

UNIT–III

5. a) Why is an inverted R-2R ladder network DAC better than R-2R ladder DAC?
   b) Describe the various types of electronic switches used in D/A converter.

OR

6. a) Explain the operation of dual-slope ADC.
   b) List the various A/D conversion techniques.

UNIT–IV

7. a) Write short note on MOS transistors.
   b) Draw and explain the circuit of two input CMOS NAND gate.

OR

8. a) What is transition time? How is it differing from propagation time?
   b) Explain the difference between static and dynamic power consumption.

UNIT–V

9. a) Implement the following function using 3:8 Decoder
   $F_1=(A,B,C) = \sum m(0,1,4,5,7)$
   b) Write a short note on priority encoder.

OR

10. a) Explain the design procedure of combinational circuit.
    b) What is the necessity of tri state buffers?

***

Hall Ticket Number :										

R-14

Code: 4G253

III B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

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)

****

UNIT–I

1. a) Draw the turn off characteristic of an SCR and explain the mechanism of turn off. 7M

   b) Explain the switching characteristics of power MOSFET. 7M

OR

2. a) What are the various turn on methods for SCR? Explain them in brief with circuit diagram and relevant waveforms. 7M

   b) What is the necessity of connecting SCRs in series? What are the problems associated with series operation of SCRs? How they are eliminated? 7M

UNIT–II

3. a) Explain the working of Resistance triggering circuit for SCR with circuit diagram and waveforms. What is its limitation? 7M

   b) Explain working of the over voltage protecting device Metal Oxide Varistor with circuit diagram and characteristic 7M

OR

4. a) An SCR has a maximum 'di/dt' rating of 15A/μs. It is operated from a 150 V supply. What is the minimum value of load inductance that will protect the device? 7M

   b) Explain 'di/dt' protection of SCR with relevant circuit diagram 7M

UNIT–III

5. a) A single phase half controlled bridge converter is used to charge a battery. A resistance is connected in series with the battery. Draw the waveform of the load voltage and load current. Derive expression for the average value of charging current of the battery 7M

   b) Calculate the average output voltage of a three phase three pulse converter operating with a firing angle of π/6 and connected to a three phase ac supply of 400V (line to line), 50 Hz. The load current is assumed to be continuous. 7M

OR

6. a) Discuss the effect of source inductance in the performance of of a single phase fully controlled full wave bridge rectifier. 7M

   b) Explain the working of a three phase dual converter in circulating current mode with relevant circuit diagram and waveforms. 7M

UNIT–IV

7. a) A step-up chopper with a pulse width of 150μs is operating on 220V dc supply. Compute the load voltage if the blocking period of the device is 40 μs. 7M

   b) Explain the current limit control strategy used for chopper. 7M

OR

8. a) Derive the expression for average load voltage and current for a step down dc chopper feeding RLE load for continuous load current operation when it is operating on Time Ratio Control strategy. 7M

   b) Explain the operation of four quadrant dc chopper with neat circuit diagram and waveforms. 7M

UNIT–V

9. a) How is output voltage controlled for inverter using pulse width modulation techniques? Explain with circuit diagram and relevant waveforms. 7M

   b) Explain the operation of single phase parallel inverter with relevant circuit diagram and waveforms. What are its limitations? 7M

OR

10. a) Derive an expression for the output current in terms of source voltage, load impedance and firing angle for a single phase ac voltage controller with RL load. 7M

    b) A single phase to single phase center-tapped cyclo converter is delivering power to a resistive load. The supply transformer has the turn rationof 1:1:1. The frequency ratio is f_o/f_s =1/5. The firing angle α for all the thyristor are the same. Sketch the time variation of the following waveforms for α=30^o.

    i. supply voltage ii. Output current iii. Supply current 7M

***

Hall Ticket Number :										

R-14

Code: 4G252

III B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

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)

****

UNIT–I

1. a) Develop an expression for the inductance of a single phase transmission line taking into account the internal flux linkages. Assume the conductors are solid. 7M

   b) Find geometric mean radius of a stranded conductor having 7 identical strands each of radius r and is shown in Fig.1. Also find the ratio of GMR to overall conductor radius. Comment on the results .

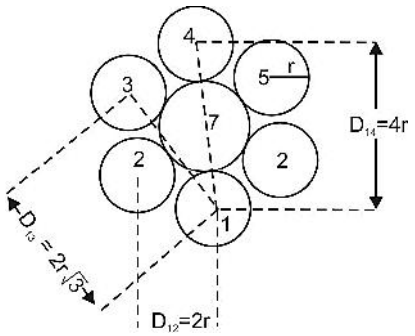

Fig.1 7M

OR

2. a) Derive an expression for electrical potential and hence deduce the formula for capacitance for the following cases:

   i) Single phase 2-conductor line

   ii) 3-phase unsymmetrical spacing, but transposed. 7M

   b) Explain skin and proximity effects on transmission line. 7M

UNIT–II

3. a) What is a nominal-circuit representation and Find ABCD constants for nominal-T circuit of a transmission line? 7M

   b) A balanced 3-phase load of 30 MW is supplied at 132 kV, 50Hz and 0.85 p.f lag by means of a transmission line. The series impedance of a single conductor is (20+j40) ohms and the total phase-neutral admittance is 315×10^{-6} mhos. Use nominal - π to determine (i) A, B, C, D constants of the line, (ii) V_s and (iii) regulation of the line. 7M

OR

4. A three-phase, 50 Hz, 180 km long transmission line has three conductors each of 0.6 cm radius, spaced at the corners of an equilateral triangle of side 3 m. The resistance of each conductor is 0.2 ohms per km and the line delivers 20 MVA at 110 kV and at a lagging p.f. of 0.9. Determine (i) ABCD constants (ii) sending-end voltage and current (iii) efficiency and regulation. 14M

UNIT–III

5. a) An over Head line has a span of 200m between level supports. The conductor diameter is 4cm and weights 0.65kg/met the allowable tension is 550kg. Calculate maximum sag 7M

   b) A 3- Phase line has a conductor diameter of 1.6 cm and spaced equilaterally 2.5m apart. If the dielectric strength of air is 30KV/cm (peak) determine the distruptive critical voltage at which corona will occur. Take air density factor=0.96 and irregularity factor =0.94. 7M

OR

6. a) Explain different types of insulators and Discuss various methods for improving the string efficiency in a string of insulators. 7M

   b) A three-phase 66KV transmission line is carried by strings of 5 suspension insulators. The capacity of each unit insulator to the capacity relative to earth is 4:1. Calculate the potential across each unit and the string efficiency. Assume that there is no leakage. 7M

UNIT–IV

7. a) Derive reflection and refraction coefficient of transmission line when terminated through a resistance. 7M

   b) An overhead line has a surge impedance of 450 Ω. A surge voltage $V= 250(e^{0.05t} – e^{-t})$ kV, where t is in μsec, travels along the line. The termination of the line is connected to two parallel overhead line transformer feeders. The surge impedance of the feeder is 350 Ω. These two transformers are protected by surge diverters each of surge impedance being 40 Ω. Determine the maximum voltage which would initially appear across the feeder end windings of each transformer due to the surge. Assume the transformer to have infinite surge impedance. 7M

OR

8. a) Discuss the behavior of a travelling wave when it reaches the end of short circuited line. Draw diagrams to show voltage and current of the line before and after the wave reaches the end . 7M

   b) A 500 kV surge travels on an overhead line of surge impedance 400 Ω towards its junction with a cable which has a surge impedance of 40Ω. Find (i) transmitted voltage and current (ii) reflected voltage and current. 7M

UNIT–V

9. a) Find expressions for capacitance, insulation resistance and dielectric stress of a single core cable. 7M

   b) Single core, lead covered cable is to be designed for 66 kV to earth. Its conductor radius is 10 mm and its three insulating materials A, B, and C have relative permittivity of 6, 5, and 4 respectively and the corresponding maximum permissible stress of 4.0, 3.0, and 2.0 kV/ mm respectively. Find the maximum diameter of the lead sheath. 7M

OR

10. a) Draw the cross section of a 3-core belted cable. Discuss the function of each part. 7M

    b) Discuss the methods of grading of cables .Why are they not used generally. 7M

***