Hall Ticket Number :										

R-11/R-13

Code : 1G356

III B.Tech. I Semester Supplementary Examinations May/June 2016

Linear and Digital Integrated Circuits Applications

(Electrical & Electronics Engineering)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1.		Discuss AC characteristics of OP amps and explain about OP amp block diagram	14M
2.	a)	Explain with neat diagram any one of the multi vibrator using 555 IC	7M
	b)	Discuss log and anti log amplifiers	7M
3.		Discuss in detail about PLL applications	14M
4.		Write short notes on the following	
		(a) Counter type ADC	7M
		(b) Weighted resistor DAC	7M
5.	a)	Explain dynamic electrical behavior of CMOS	10M
	b)	Draw 2 – input CMOS EX- NOR gate and explain	4M
6.		Discuss the following	
		(a) Emitter coupled logic	8M
		(b) Comparison of logic families	6M
7.		Explain with neat diagram explain the functionality of IC 74 XX 138	14M
8.	a)	Give the comparison between combinational and sequential logic circuits	6M
	b)	Design BCD to seven segment decoder	8M

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Hall Ticket Number :										

R-11/R-13

Code : 1G251

III B.Tech. I Semester Supplementary Examinations May/June 2016

Electrical Machines-III

(Electrical & Electronics Engineering)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1. a) Describe, with neat sketches, the constructional details of a salient pole type alternator? 7M
   b) What are the advantages of short pitching? Derive an equation for distribution factor? 7M
2. a) What are the causes of harmonics in the voltage waveform of an alternator? How can these be minimized? 7M
   b) Calculate the rms value of the induced emf per phase of a 10-pole, 3 ϕ, 50 Hz alternator with 2 slots per pole per phase and 4 conductors per slot in two layers. The coil span is 150^0. The flux per pole has a fundamental component of 0.12 Wb and a 20% third harmonic component? 7M
3. a) Derive an expression for finding regulation of salient pole alternator using two reaction theory? Draw its phasor diagram? 7M
   b) From the following test results, determine the regulation of a 2 Kv single phase alternator, delivering a current of 100 A at 0.8 pf leading. Test results: full load current of 100 A is produced on short circuit by a field excitation of 2.5 A. an emf of 500 V is produced on open circuit by the same field current. The armature resistance is 0.8Ω? 7M
4. a) What are the conditions to be fulfilled for parallel operation of two synchronous machines? Give any one method of synchronizing? 7M
   b) A 10 MVA, 10 Kv, 3ϕ, 50 Hz, 1500 rpm alternator is paralleled with others of much greater capacity. The moment of inertia of the rotor is 2×10^5 kg-m^2 and the synchronous reactance of the machine is 40%. Calculate the frequency of oscillation of the rotor? 7M
5. a) What is meant by constant power circle for synchronous motor? How is it derived? 7M
   b) Explain effects of varying excitation on armature current and power factor in a synchronous motor. Draw 'V' curves? 7M
6. a) Show that the starting torque of a single phase induction motor is zero? 6M
   b) The following data pertains to a 230 V 50 Hz capacitor start single phase induction motor at stand still. Main winding excited alone = 100 V, 2 A, 40 W Auxiliary winding excited alone = 80 V, 1 A, 50W. Determine the value of capacitance for determining the maximum starting torque? 8M
7. a) Explain any two different modes of excitation of variable reluctance stepping motor? 7M
   b) Discuss the various methods of speed control of universal motors? 7M
8. a) Explain the construction, working and applications of a stepper motor? 8M
   b) What is servomotor? Compare the AC and DC servomotors? 6M

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Hall Ticket Number :										

R-11/R-13

Code : 1G252

III B.Tech. I Semester Supplementary Examinations May/June 2016

Transmission of Electric Power

(Electrical & Electronics Engineering)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1. a) Calculate the inductance per phase of a three-phase double circuit line if the conductors are spaced at the vertices of a hexagon of side 2 m each. The diameter of each conductor is 2.0 cm. 7M

   b) Explain the terms geometrical mean distance(GMD) and self GMD in the calculation of inductance of single phase transmission lines with composite conductors. 7M

2. a) Derive an expression for the capacitance per km of a single phase line taking into account the effect of ground 7M

   b) Calculate the capacitance of a three-phase three-wire system with triangular configuration with sides D_{12} = 3 m, D_{23} = 4 m and D_{31} = 5 m. The diameter of the conductor is 2.5 cm and the permittivity of the conductor material is 150. 7M

3. a) Draw the phasor diagram of a short transmission line and derive an expression for voltage regulation. 4M

   b) A 345 KV 3 phase transmission line is 130km long. The resistance per phase =0.036 ohms/km and inductance per phase is 0.8 mH/km. The shunt capacitance is 0.0112 micro Farad/km. The receiving end load is 270MVA with 0.8 power factor lagging at 325KV. Find the voltage and power at the sending end and the voltage regulation. Use **(i)** nominal T method **(ii)** nominal π method **(iii)** ABCD constants. Compare the result. 10M

4. a) Derive the expressions for the ABCD constants for a long transmission line. 4M

   b) The line constants of a three-phase long line are: A= D= 0.931+j 0.01; B = 35+j130 ohms; C= (-6 + j900) 10^{-6}mhos. The load at the receiving end of the line is 100 MW at 220 kV with a power factor of 0.8 lagging. Determine the sending-end voltage and the regulation of line. 10M

5. a) Explain Bewley's Lattice diagram and give its uses. 4M

   b) The ends of two long transmission lines, A and C are connected by a cable B, 1km long. The surge impedances of A, B, C are 400, 50 and 500 ohms respectively. A rectangular voltage wave of 25 kV magnitude and of infinite length is initiated in A and travels to C, determine the first and second voltages impressed on C. 10M

6. a) A string of suspension insulators consists of 6 units. If the maximum peak voltage per unit is 33 kV, calculate (i) the maximum voltage for which this string can be used, (ii) Voltage across the third unit from the bottom (iii) the string efficiency. Assume capacitance between each pin and earth as 12 percent of the self-capacitance of each unit. 7M

   b) Explain capacitance grading and static shielding. 7M

7. a) Define disruptive critical voltage and visual critical voltage. On what factor do they depend? Derive equations for calculating these voltages. 7M

   b) A 132kV overhead line conductor of radius 1cm is built so that corona takes place if the line voltage is 210 kV (r.m.s). If the value of voltage gradient at which ionization occurs can be taken as 21.21 kV (r.m.s) per cm, determine the spacing between the conductors. 7M

8. a) Derive the expression for the insulation resistance of a single core cable. 7M

   b) A cable has been insulated with two insulating materials having permittivity of 6 and 4 respectively. The inner and outer diameter of a cable is 3 cms and 7 cms. If the dielectric stress is 50 kV/cm and 30 kV/cm, calculate the radial thickness of each insulating layer and the safe working voltage of the cable. 7M

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Hall Ticket Number :										

R-11/R-13

Code : 1G253

III B.Tech. I Semester Supplementary Examinations May/June 2016

Power Electronics

(Electrical & Electronics Engineering)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1. a) Explain the switching characteristics of the IGBT with the help of neat circuit diagram and waveforms? 7M
   b) Compare power MOSFET and IGBT. 7M

2. a) With the help of a neat circuit, explain the two transistor analogy of an SCR? 7M
   b) SCR's with a rating of 1000V and 200A are available to be used in a string to handle 6KV and 1KA. Calculate the number of series and parallel units required derating factor is (**i**).0.1 (**ii**).0.2 7M

3. a) Write about Snubber circuit in detail? 7M
   b) Explain about over current protection of an SCR in brief? 7M

4. a) Explain the operation of Single phase fully controlled converter. In what respect is the operation of this circuit different for R, RL and RLE loads? 7M
   b) Discuss in detail the effect of freewheeling diode? 7M

5. a) Explain the operation of a three phase dual converter with non circulating mode of operation? 7M
   b) Discuss in detail about the effect of source inductance on the performance of converter? 7M

6. a) What is an AC voltage controller? List some of its industrial applications. Enumerate its merits and demerits. 7M
   b) A single-phase voltage controller has input voltage of 230V, 50Hz and a load of R=15Ω. For 6 cycles on and 4 cycles off, determine
   (**i**). r.m.s output voltage (**ii**).input pf (**iii**).average and r.m.s thyristor currents. 7M

7. a) Explain the time ratio control and current limit control strategies used for chopper. 7M
   b) Explain the working of Morgans chopper in detail. 7M

8. a) Explain the principle of operation of Series inverter? What are its limitations? 7M
   b) How is the output voltage and frequency of a PWM inverter varied? 7M

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Hall Ticket Number :										

R-11/R-13

Code : 1G254

III B.Tech. I Semester Supplementary Examinations May/June 2016

Electrical and Electronics Measurements

(Electrical & Electronics Engineering)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1. a) Compare attraction and repulsion type of M.I. instruments in any eight aspects. 8M

   b) The inductance of a M.I instrument is given by: $L = (10 + 5\theta - \theta^2)\mu H$ where θ is the deflection in radians from zero position. The spring constant is 12×10^{-6} N-m/rad. Calculate the deflection for a current of 5A. 6M

2. Explain the constructional details and working of a single phase electrodynamometer type of power factor meter. Prove that the special displacement of moving system is equal to the phase angle of the system. 14M

3. Explain how the following adjustments are made in a single phase induction type energy meter
   (i) Lag adjustment
   (ii) Adjustment for friction compensation
   (iii) Creep
   (iv) Overload compensation
   (v) Temperature compensation 14M

4. a) Explain the construction and working principle of DC Crompton's potentiometer. 8M

   b) Explain the term "Standardization" of potentiometer. Describe the procedure of standardization of a DC potentiometer. 6M

5. a) Draw the circuit of a Kelvin's double bridge used for measurement of low resistances. Derive the condition for balance. 10M

   b) A 4 terminal resistor approximately of 50 μΩ resistance was measured by means of a Kelvin bridge having the following component resistances.
   Standard resistor=100.02 μΩ;
   Inner ratio arms=100.30 Ω and 200 Ω;
   Outer ratio arms=100.23 Ω and 200 Ω. Resistance of link connecting the standard and the unknown resistance=700 μΩ. Calculate the value of unknown resistance to the nearest 0.01 μΩ. 4M

6. Prove that the change in value of flux is directly proportional to the change in the deflection in case of flux meter. 14M

7. Describe the different parts of a CRT with a neat sketch. 14M

8. Explain with the help of a functional block diagram, the principle of operation of a digital frequency meter. 14M

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Hall Ticket Number :										

R-11/R-13

Code : 1GC52

III B.Tech. I Semester Supplementary Examinations May/June 2016

Environmental Science

(Electrical & Electronics Engineering)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1. a) Explain the environmental problems faced by human beings across the globe with suitable examples? 8M
   b) Justify that public awareness is required for protecting the Environment? 6M

2. a) What are the problems due to over utilization of water resources? 8M
   b) Write a note on the classification of various types of energy resources 6M

3. a) Explain briefly
      i) World food problems
      ii) Problems due to use of Fertilizers and Pesticides 8M
   b) What are the measures to be taken for prevent desertification? 6M

4. a) Explain the causes and effects of water pollution? 7M
   b) How do you manage the urban solid waste- Explain? 7M

5. a) Explain the food chain and food web with suitable illustration? 7M
   b) Briefly explain the structure and function of aquatic ecosystem? 7M

6. a) Justify that India as a Mega Bio-diversity habitat? 7M
   b) Briefly explain the threats to Biodiversity? 7M

7. a) Explain the importance and concept of sustainable development? 7M
   b) Briefly explain the salient features of Air (Prevention and control of pollution) act? 7M

8. Explain the influence of Environment on human health? 14M

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