Hall Ticket Number :										

R-15

Code: 5G359

III B.Tech. I Semester Supplementary Examinations October 2020

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)	What are the different package types and temperature ranges of IC's	6M
	b)	How the op-amp acts as V-I and I-V converter?	8M
		OR	
2.	a)	List the ideal characteristics of an op-amp.	4M
	b)	Draw the internal diagram of an op-amp and explain the operation of each section.	10M

UNIT–II

3.	a)	Draw IC 555 timer functional diagram and explain its function.	7M
	b)	Draw PLL block diagram and briefly explain the operation of each block.	7M
		OR	
4.	a)	Explain about basic DAC techniques.	8M
	b)	List the applications of DAC and ADC.	6M

UNIT–III

5.		Give a detailed list of CMOS, TTL & ECL logic families.	14M
		OR	
6.	a)	Construct CMOS inverter circuit and explain the different regions of operation using its transfer characteristics.	7M
	b)	Draw and explain the operation of 2-input CMOS NAND gate.	7M

UNIT–IV

7.	a)	Explain the operation of full adder with truth tables.	6M
	b)	With an example explain the operation of IC 75X85.	8M
		OR	
8.	a)	Write a shot note on Arithmetic and Logic Unit.	7M
	b)	What do you mean by carry propagation delay?	7M

UNIT–V

9.	a)	Compare combinational and sequential logic circuits.	7M
	b)	Explain about race around condition and how it can be reduced?	7M
		OR	
10.		Draw and explain the operation of RS, JK, D and T flip flops with their pin diagrams and logic diagrams.	14M

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Hall Ticket Number :										

R-15

Code: 5G253

III B.Tech. I Semester Supplementary Examinations October 2020

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) Describe the different modes of operation of a Thyristor with the help of its static characteristics.
   b) Explain the characteristics of BJT.

OR

2. a) Explain the Voltage ratings of SCR.
   b) Discuss the operation of CLASS-D (voltage) commutation along with necessary waveforms.

UNIT–II

3. a) Explain the working of Resistance triggering circuit for SCR with circuit diagram and waveforms. What is its limitation?
   b) Explain working of the over voltage protecting device Metal Oxide Varistor with circuit diagram and characteristic

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

UNIT–III

5. a) Describe the working of a single phase Half controlled converter with R load through the waveforms and circuit diagram
   b) A single phase, full controlled converter supplies an inductive load. Supply voltage is 230V, 50Hz and the firing angle is 60^0. Assume that the output current is continuous, ripple free and equal to 5 A. Determine average output voltage.

OR

6. a) Describe the working of a Three phase full controlled converter with RL load through the waveforms and circuit diagram
   b) Distinguish between Circulating & non-circulating current modes of Dual converter.

UNIT–IV

7. a) A Class A chopper circuit is operating on Time Ratio Control (TRC) principle at a frequency of 1 kHz on a 220V dc supply. If the load voltage is 180V, calculate the conducting and blocking period of Thyristor in each cycle.
   b) Draw the circuit of a two quadrant chopper and explain its working.

OR

8. a) Compare between Time Ratio Control and Current Limit Control of dc chopper with relevant circuit diagram and waveforms.
   b) A dc chopper(Class A) circuit connected to a 100V dc source supplies a resistive load of R=5 Ohm in series with an inductance of 40 mH. A freewheeling diode is connected across the load. The load current varies between the limits of 10A and 12A. Compute the time ratio of the chopper

UNIT–V

9. a) Explain the operation of single phase A.C. Voltage controller with a neat circuit diagram and output waveforms for R load
   b) Explain the operation of single phase mid-point cycloconverter with RL loads for continuous conduction with relevant circuit diagram and necessary output waveforms for $f_0=1/3\ f_s$.

OR

10. a) Explain different PWM techniques in brief.
    b) Explain the operation of single phase half bridge inverter with neat diagram.

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Hall Ticket Number :										

R-15

Code: 5G252

III B.Tech. I Semester Supplementary Examinations October 2020

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) Clearly explain what you understand by GMR and GMR of a transmission line.

   b) Calculate the inductance per phase of a three phase system, which has 1.8 cm diameter and conductors are placed at the corners of an equilateral triangle of sides 3.5 m

OR

2. a) What you understand by transposition of lines? What are its effects on the performance of the line?

   b) Calculate the capacitance of a three phase three wire transposed system. When the conductors are arranged at the corners of a triangle with sides measuring 1.5m,2m and 2.5 m. Diameter of each conductor is 1.2 cm.

UNIT–II

3. a) Derive the expressions for the ABCD constants for the nominal-π circuit of a medium transmission line.

   b) A single-phase, 11 kV line with a length of 15 km is to transmit 500 kVA. The inductive reactance of the line is 0.6 Ω per km and the resistance is 0.25Ω per km. Calculate the efficiency and regulation for a p.f of 0.75 lag

OR

4. A three phase 50 Hz transmission line has resistance, inductance and capacitance per phase of 0.1 ohm and 0.01 micro farad respectively and delivers a load of 25 MW at 110 KV and 0.8 p.f lagging. Determine the efficiency and regulation of the line using nominal π method

UNIT–III

5. a) Explain the following insulators
   i) pin type insulators
   ii) strain insulator

   b) Ina string of three units, the capacitance between each link pin to earth is 11 % of the capacitance of one unit. Calculate the voltage across each unit and the string efficiency when the voltage across the string is 33 KV.

OR

6. a) Describe the phenomenon of corona. Explain the factors affecting corona.

   b) A three phase 220 KV, 50 Hz overhead line consists of 2.5 cm diameter conductor spaced in equilateral formation. Determine the corona loss per kilometer of the line at 20° C and atmospheric pressure 75 cm Hg, conductor surface factor 0.84,Take irregularity factor as 0.8.

UNIT–IV

7. a) Discuss the phenomenon of wave reflection and refraction. Derive expressions for reflection and refraction coefficients.

   b) A 200 kV, 3 μs, rectangular surge travels on a line of surge impedance of 400 ohms. The line is terminated in a capacitance of 3000 pf. Find an expression for voltage across the capacitance.

OR

8. a) Draw equivalent circuit for finding the transmitted voltage and current surges on a forked line. Derive expressions for the transmitted voltage and currents

   b) Two stations are connected together by an underground cable having a surge impedance of 60 ohms joined to an overhead line with a surge impedance of 400 ohms. If a surge having a maximum valve of 100 kV travels along the cable towards the junction with the overhead line, determine the value of the reflected and transmitted wave of voltage and current at the junction

UNIT–V

9. a) Describe with a neat sketch the construction of three core cable?

   b) A 66 KV concentric with two inter sheaths has a core diameter of 2.3 cm: diameter material of 3.5 mm thickness constitutes three zones of insulation. Determine the maximum stress in each of the three layers, if 22 KV is maintained across each of the inner two layers

OR

10. Explain inter sheath grading and capacitance grading

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Hall Ticket Number :										

R-15

Code: 5G254

III B.Tech. I Semester Supplementary Examinations October 2020

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) Describe the construction and working of PMMC Instrument. 7M

   b) The inductance of the moving iron ammeter with full scale deflection of 90^0 at 1.5 A is given by expression $L=[200+40\Theta-4\Theta^2-\Theta^3]\mu H$ where Θ is the deflection in radians from zero position. Estimate the angular deflection of the pointer for a current of 1.0 A. 7M

OR

2. a) Discuss the Major Sources of errors in CT 7M

   b) Derive the Expression for Ratio and Phase angle errors 7M

UNIT–II

3. 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

OR

4. Draw a neat sketch of showing the construction of single phase induction type energy meter & explain the theory & operation of it. 14M

UNIT–III

5. a) Draw the basic diagram of basic slide wire Potentiometer. Explain its Working 7M

   b) Explain why standardization is required in Potentiometer. 7M

OR

6. Explain what do you mean by low, medium and high resistances? Suggest various suitable methods for measuring them giving justification. Explain any method to measure a low resistance with accuracy? 14M

UNIT–IV

7. a) Describe the construction and working of a co-ordinate type a.c. potentiometer. How is it standardized? Explain how an unknown voltage can be measured with it? 10M

   b) A simple slide wire is used for measurement of current in a circuit. The voltage drop across a standard resistance of 0.1Ω is balanced at 75 cm. Find the magnitude of the current if the standard cell emf of 1.45 V is balanced at 50 cm? 4M

OR

8. a) Describe the method for determination of B-H curve of a magnetic material using (i) Method of Reversals and (ii) Step by Step method? 10M

   b) The constant of a given magnetic potentiometer is obtained by aid of a coil of 300 turns in which a current of 0.6 A is reversed. The resulting throw of the galvanometer is 157 scale divisions. It is then used to measure the magnetic potential difference between two points and the throw is 304 divisions. Find the magnetic potential difference? 4M

UNIT–V

9. a) Draw the block diagram of Oscilloscope and explain the operation of it. 7M

   b) What do you mean by Lissajous pattern? How do you measure by using CRO? 7M

OR

10. a) Explain the working principle of digital Tachometer with the help of neat diagram. 7M

    b) List out the Advantages and Disadvantages of digital Instruments over Analog Instruments. 7M

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Hall Ticket Number :										

R-15

Code: 5G251

III B.Tech. I Semester Supplementary Examinations October 2020

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) Distinguish the following (i) integral slot and fractional slot windings (ii) single and double layer windings (iii) full pitch and short pitch coils. 7M

   b) A 3-phase, 8 pole, 750 rpm synchronous alternator has 72 slots. Each slot has 12 conductors and winding is short pitched by 2 slots. Find pitch factor and breadth factor. If flux per pole is 0.06wb, find induced emf per phase. 7M

OR

2. a) Write causes of Harmonics and suppression of harmonics in alternators 7M

   b) A 50Hz, 600 rpm, salient pole synchronous generator has a sinusoidal flux density having a maximum value of 1 tesla. The generator has 180 slots wound with 2 layer 3 turn coils. The coils. The coil span is 15 slots and phase spread is 60 degrees. The armature diameter is 1.25m and core length 0.45m. Find

   i) peak value of emf per conductor ii) peak value of emf per coil

   iii) rms phase and line voltage, if the machine is star connected. 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. Discriminate the effect of change of excitation and mechanical power input on parallel operation of alternators. 14M

OR

6. Demonstrate the operation of synchronization of an alternator with an infinite bus 7M

   A 2MVA, 3 phase, star connected, 8 pole, 750 rfpm alternator is operating on 6000V bus bars. Synchronous reactance is 6 ohms/phase. Find synchronizing power and torque per mechanical degree of displacement for full load, 0.8 pf lagging. 7M

UNIT–IV

7. a) Classify and explain different methods of starting of synchronous motor. 7M

   b) A 6600V, 3 phase star connected synchronous motor works at constant voltage and constant excitation. Its synchronous impedance is (2+j20) ohm/phase. When the input is 1000KW, the pf is 0.8 leading. Find the pf when the input is increased to 1500KW. 7M

OR

8. a) Compare how the armature current and power factor varies with the field current of synchronous motor. 7M

   b) A 2300V, 3 phase star connected synchronous motor has a synchronous reactance of 10ohms/phase. When the motor delivers 255hp the efficiency is 90% (exclusive of field loss). The power angle is 20^0. Calculate (i) E per phase (ii) current and (iii) power factor. Neglect resistance. 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) Briefly discuss any two different methods used for starting of one phase induction motor with neat diagram. 7M

    b) Draw a diagram showing the construction of a stepper motor and discuss its operation briefly. 7M

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