Hall Ticket Number :										

Code: 4G359

R-14

III B.Tech. I Semester Regular Examinations November 2016

Linear and Digital Integrated Circuits Applications

(Electrical & 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 block diagram representation of a typical Op-Amp. 5M
   b) Discuss the DC characteristics of an Op-Amp in detail. 9M

OR

2. a) List out the features of 741-Op-Amp in detail. 5M
   b) Discuss the AC characteristics of an Op-Amp in detail. 9M

UNIT–II

3. a) Draw and explain the monostable operation of 555 timer. 7M
   b) Draw the block diagram of 565 PLL and explain its principle of operation. 7M

OR

4. a) Explain the working principle of successive approximation ADC with a neat diagram. 7M
   b) Explain the various DAC/ADC specifications in detail. 7M

UNIT–III

5. a) With neat sketches explain the transfer characteristics of a CMOS inverter. 7M
   b) Design a 3 input NAND gate and explain its operation. 7M

OR

6. a) With neat sketches explain Emitter coupled logic. 7M
   b) With neat sketches explain CMOS/TTL interfacing 7M

UNIT–IV

7. a) Realize a 32:1 multiplexer using two 16:1 multiplexer ICs. 7M
   b) Design a BCD-to-Gray code converter using NAND gates only. 7M

OR

8. a) Design a 4-bit Adder/Subtractor circuit with ADD/SUB control line. 7M
   b) Design a 2-bit comparator using gates. 7M

UNIT–V

9. a) Convert an S-R Flip-flop to a J-K Flip-flop. 7M
   b) Design a synchronous modulo-4 UP/DOWN counter using J-K flip-flops. 7M

OR

10. a) Classify and explain the different type of flip-flops. 7M
    b) Explain the Synchronous counter design through an example. 7M

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Hall Ticket Number :										

R-14

Code: 4G251

III B.Tech. I Semester Regular Examinations November 2016

Electrical Machines-III

(Electrical & Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70Marks)

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UNIT–I

1. a) With a neat diagram explain the constructional features of a synchronous generator 7M

   b) A 3-ϕ, 10 pole, Y-connected alternator runs at 600 RPM. It has 120 stator slots with 8 conductors per slot and the conductors of each phase are connected in series. Determine the phase and line e.m.f 's, if the flux per pole is 56 mwb. Assume full pitched coils. 7M

OR

2. a) From the first principles, derive the E.M.F equation of an alternator 7M

   b) Explain the concept of harmonics in generated E.M.F of an alternator and suggest the method of their suppression 7M

UNIT–II

3. a) Explain in detail the effect of armature reaction in alternators at various loads and power factors with neat diagrams 7M

   b) With a neat circuit diagram explain how the regulation of an alternator is found out experimentally using ZPF method 7M

OR

4. a) Explain the load characteristics of an alternator 7M

   b) A 30 KVA, 440 V, 50 Hz, 3-ϕ, Y – connected synchronous generator gave the following data

I_f (A)	2	4	6	7	8	10	12	14
Terminal voltage (V)	155	287	395	440	475	530	570	592
S.C. Current	11	22	34	40	46	57	69	80

   Resistance between any two terminals is 0.3Ω. Find regulation at full load, 0.8 pf lagging by MMF method. 7M

UNIT–III

5. a) Explain the operation of synchronization of alternator with an infinite bus 7M

   b) A 3-ϕ, 400 KVA, 6.6 KV, 1500 RPM, 50 Hz alternator is running in parallel with infinite bus bars. Its synchronous reactance is 25%.

   Calculate (**i**) for no load (**ii**) full load, 0.8 pf lagging the synchronous power and torque per unit mechanical angle of displacement. 7M

OR

6. Explain the effect of change of excitation and mechanical power input on parallel operation of alternators using suitable diagrams. 14 M

UNIT–IV

7. a) Explain excitation and power circles of a synchronous motor 7M

   b) A 6600 V, 3-ϕ, Y-connected synchronous motor works at constant voltage and constant excitation. Its synchronous impedance is (2+j20) Ω / phase. When the input is 1000 KW, the pf is 0.8 leading, find the pf when the input is increased by 1500 KW 7M

OR

8. a) What is meant by Hunting in a synchronous motor and explain the methods of its suppression 7M

   b) Explain in detail various methods of starting of synchronous motors 7M

UNIT–V

9. a) Explain the concept of Double revolving field theory in 1-ϕ motors 7M

   b) Draw and explain the performance of an a.c series motor with the help of vector diagrams 7M

OR

10. a) Explain the construction and operating characteristics of a stepper motor 7M

    b) Explain in brief the operation of a shaded pole motor 7M

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Hall Ticket Number :										

R-14

Code: 4G252

III B.Tech. I Semester Regular Examinations November 2016

Transmission of Electric Power

(Electrical & Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70Marks)

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UNIT–I

1. a) Derive an expression for the inductance due to a single current carrying conductor. 7M

   b) A 3 phase 100 km long transmission line has its conductors of 2.0 cm diameter spaced at the corners of the equilateral triangle of 100cm side. Find inductance per phase of the system 7M

OR

2. a) Calculate the capacitance of a conductor per phase of 3 phase 400km long line with the conductors spaced at the corners of an equilateral triangle of side 6m and the diameter of each conductor is 3cm. 7M

   b) Derive the expression for capacitance of a three phase symmetrical transmission line. 7M

UNIT–II

3. a) Derive the A, B, C, D parameters for medium transmission lines using nominal-$\prod$ method. 7M

   b) A single-phase 50Hz generator supplies an inductive load of 3,000kW at a power factor of 0.707 lagging by means of an overhead transmission line 20km long. The line resistance and inductance are 0.0196ohm and 0.65mH per km. The voltage at the receiving end is 10kV. Find the sending end voltage and voltage regulation of the line. 7M

OR

4. a) Explain clearly the Ferranti effect with phasor diagram. 7M

   b) A 3-phase overhead transmission line delivers a load of 100MW at 0.8p.f lagging and 220kV between the lines. Its total series impedance per phase and total shunt admittance per phase are $220\angle 80^0$ohms and $0.0013\angle 90^0$ mho per phase respectively.
   Using nominal-T method, find A, B, C, D constants of the line. 7M

UNIT–III

5. a) Explain about distortion, reflection and refraction coefficients related to travelling waves. 9M

   b) What are the different types of transients and how they occur? 5M

OR

6. Define propagation of surge and explain the procedure for travelling wave phenomenon for line terminated with open circuit. 14M

UNIT–IV

7. a) Explain briefly on the following:
   i) Suspension type insulators **ii)** String type insulators 8M

   b) An overhead transmission line has a span of 220m, the conductor weighing 804kg/km. Calculate the maximum sag if the ultimate tensile strength of the conductor is 5,758kg.Assume safety factor 2. 6M

OR

8. Explain about corona and string efficiency. Describe the methods of improving the string efficiency. 14M

UNIT–V

9. With a neat sketch explain the various parts in the underground cable. 14M

OR

10. What is the necessity of underground cable and list out the types of insulating materials and explain. 14M

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Hall Ticket Number :										

R-14

Code: 4G253

III B.Tech. I Semester Regular Examinations November 2016

Power Electronics

(Electrical & 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) Briefly explain the static characteristics of SCR. 7M
   b) Explain the characteristics of power MOSFET. 7M

OR

2. a) Briefly explain the turn on methods of SCR 7M
   b) Briefly explain the current ratings of a SCR. 7M

UNIT–II

3. a) Explain the R-triggering and RC-triggering methods of a SCR with neat circuit diagram and necessary waveforms. 7M
   b) Describe the di/dt protection of a SCR. 7M

OR

4. a) Briefly explain about the semiconductor fuses. 7M
   b) Explain the designing of a snubber circuit for the protection of a SCR. 7M

UNIT–III

5. a) With the help of neat circuit and waveforms explain the operation of fully controlled converter with RL load. 7M
   b) What is the purpose of freewheeling diode? What changes can be observed by adding it in the circuit. 7M

OR

6. a) Explain the operation of six pulse converter with R load. Draw the necessary waveforms. 7M
   b) Explain the effect of source impedance in two pulse converters. 7M

UNIT–IV

7. a) Explain the operation of Two-quadrant type D chopper along with its waveforms. 7M
   b) Explain the operation of load commutated chopper 7M

OR

8. a) Explain the current limiting control strategies of a chopper circuit 7M
   b) A load commutated chopper, fed from a 230V d.c. source has a constant load current of 40A. For a duty cycle of 0.5 and a frequency of 3kHz, calculate 7M
      i. Commutating capacitance **ii.** Average output voltage
      iii. Circuit turn-off time of one SCR pair **iv.** Total commutation interval.

UNIT–V

9. a) Briefly explain the operation of parallel inverter 7M
   b) Briefly explain the voltage control techniques of an inverter. 7M

OR

10. a) Explain the operation of an A.C voltage controller with triac for RL load. 7M
    b) Briefly explain the operation of a single phase midpoint cycloconverter with R load. 7M

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Hall Ticket Number :										

R-14

Code: 4G254

III B.Tech. I Semester Regular Examinations November 2016

Electrical and Electronics Measurements

(Electrical & Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70Marks)

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UNIT–I

1. a) Distinguish between the direct and indirect methods of measurement with suitable examples. 7M

   b) Design an Ayrton shunt to provide an ammeter with current ranges of 1A, 5A and 10A. A basic meter with an internal resistance of 50 Ω and a full scale deflection current of 1 mA is to be used. 7M

OR

2. a) Describe the constructional details of an attraction type moving iron instrument with the help of a neat diagram. Derive the equation for deflection if spring control is used and comment upon the shape of scale. 7M

   b) A permanent magnet moving coil instrument has a coil dimensions 15 mm X 12 mm. the flux density in the air gap is 1.8 X 10^{-3} Wb/m^2 and the spring constant is 0.14 X 10^{-6} Nm/rad. Determine the number of turns required to produce an angular deflection of 90 degrees when a current of 5 mA is flowing through the coil. 7M

UNIT–II

3. a) Describe the constructional details of an electrodynamometer type wattmeter. Derive the expression for torque when the instrument is used on a.c. Explain why it is necessary to make the potential coil circuit purely resistive? 7M

   b) Two watt meters connected to measure the input to a balanced 3 phase circuit indicate 2000W and 500W respectively. Find the power factor of circuit

      i. When both readings are positive

      ii. When the latter reading is obtained after reversing the connections to the current coil of first instrument. 7M

OR

4. a) Describe the constructional details of a single phase induction type energy meter. 7M

   b) The meter constant of a 230 V, 10A watt hour meter is 1800 revolutions per kWh. The meter is tested at half load rated voltage and unity power factor. The meter is found to make 80 revolutions in 138 sec. determine the meter error at half load. 7M

UNIT–III

5. a) Describe the basic principle of operation of a DC potentiometer. Explain why a potentiometer does not load the voltage source whose voltage is being determined. 7M

   b) Explain the term standardization of a potentiometer. Describe the procedure of standardization of a dc potentiometer. 7M

OR

6. a) Draw the circuit of Wheatstone bridge and derive the conditions of balance. 7M

   b) A Wheatstone bridge has ratio arms of 1000Ω and 100Ω and is being used to measure an unknown resistance of 25Ω. Two galvanometers are available. Galvanometer A has a resistance of 50Ω and a sensitivity of 200mm/μA and galvanometer B has values 600Ω and 500mm/μA. which of the two galvanometers more is sensitive to a small unbalance on the bridge and what is the ratio of sensitivities? 7M

UNIT–IV

7. a) Describe how an unknown capacitance can be measured with the help of D'Sauty's bridge. 7M

   b) Describe the sources and null detectors that are used for ac bridges. 7M

OR

8. a) Describe the reversal method for determination of B-H curve of a magnetic material. 7M

   b) The iron loss in a sample is 300W at 50 Hz with eddy current loss component 5 times as big as the hysteresis loss component. At what frequency will the iron loss be double if the flux density is kept the same? 7M

UNIT–V

9. a) Describe an overview of applications of a CRO. 7M

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

OR

10. a) Draw and explain the circuit of a digital frequency meter. What are the different methods used for high frequency determination? 7M

    b) Explain the functioning of a ramp type digital voltmeter. 7M

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Hall Ticket Number :										

R-14

Code: 4GC52

III B.Tech. I Semester Regular Examinations November 2016

Environmental Science

(Electrical & Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70Marks)

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UNIT–I

1. a) Discuss the impact of environment on human beings?
   b) How individual can involve themselves in the process of improving the environment?

OR

2. a) Explain the term 'population explosion'. Enumerate its effects?
   b) Discuss the causes of soil pollution and their control?

UNIT–II

3. a) Discuss the environmental effects of extracting and using mineral resources?
   b) What are Photo Voltaic Systems (SPV). Explain how electricity is generated by solar photovoltaic systems (SPV). What are the merits and limitations of SPV Systems?

OR

4. a) What is an ecosystem? Classify ecosystems on the basis of energy sources?
   b) Describe the characteristics features, structure and function of the grassland ecosystem?

UNIT–III

5. a) What do you understand by 'Hotspots of Biodiversity'? Name and briefly describe, along with vital signs, the two hotspots of biodiversity that extend into India?
   b) Briefly discuss the direct and indirect values assigned to biodiversity?

OR

6. a) Name and discuss the causes of extinction of species?
   b) Explain 'In-situ' and 'Ex-situ conservation along with their merits and limitations?

UNIT–IV

7. a) Define air pollution. What are the sources of air pollutants? How you will classify air pollutants?
   b) Briefly describe the general marine oil spill scenario, along with the effects of and control or remedial measures of oil spillage.

OR

8. a) What is water pollution? Briefly discuss the sources of water pollution?
   b) Discuss the causes of Noise pollution and their control?

UNIT–V

9. a) Write a note on Global Warming?
   b) Discuss the salient features of the Wildlife Protection Act, 1972?

OR

10. a) Briefly discuss the problem of Human Rights?
    b) What is AIDS? What are the sources and mode of transmission of HIV infection?

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