R-14

Code: 4G254

III B.Tech. I Semester Supplementary Examinations May 2017
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) Describe how high currents and voltages are measured with the help of instrument transformers.   7M

    b) A voltage has true value of 1.50 V. An analog indicating instrument with a scale range of 0-2.50 V shows a voltage of 1.46 V. What are the values of absolute error and correction? Express the error as a fraction of the true value and the full scale deflection.   7M

OR

2. a) Describe the constructional details and working of electrodynamometer type instrument.   7M

    b) The inductance of a 25A electro dynamic ammeter changes uniformly at the rate of 0.0035 µH/degree. The spring constant is 10^{-6} N-m/degree. Determine the angular deflection at full scale.   7M

UNIT–II

3. a) Describe the construction and working of three phase alternating field power factor meter.   7M

    b) Explain the advantages and disadvantages of moving iron type power factor meters.   7M

OR

4. a) What are the different methods of measurement of frequency in the power frequency range?   7M

    b) Explain the construction and working of Weston frequency meter.   7M

UNIT–III

5. a) Describe the construction and working of a co-ordinate type ac potentiometer. How is it standardized?   7M

    b) Explain the reasons why dc potentiometers cannot be used for ac measurements straightaway. Explain the modifications that are needed in a dc potentiometer to be used for ac applications.   7M

OR

6. a) Draw the circuit of a Kelvin's double bridge and explain how it is used to measure low resistance.   7M

    b) Explain what are the different problems associated with measurement of low resistance.   7M

7. a) Derive the equations for balance in the case of Maxwell's inductance capacitance bridge. Draw the phasor diagram for balanced conditions.   7M

    b) A four arm ac bridge a, b, c, d has the following impedances:

    Arm ab: $Z_1 = 200 \angle 60^0$ (inductive impedance)

    Arm ad: $Z_2 = 400 \angle -60^0$ (purely capacitive impedance)

    Arm bc: $Z_3 = 300 \angle 0^0$ (purely resistive)

    Arm cd: $Z_4 = 600 \angle 30^0$ (inductive impedance)

    Determine whether it is possible to balance the bridge under above conditions.   7M

OR

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

    b) Derive the expression for equation of motion for ballistic galvanometer.   7M

UNIT–V

9. a) What are the different types of amplifiers used for CROs? Describe the basis on which they are classified.   7M

    b) An electrically deflected CRT has a final anode voltage of 2000V and parallel deflecting plates 1.5 cm long and 5 m apart. If the screen is 50 cm from the centre of deflecting plates, find

    (i)   Beam speed
    (ii) The deflection sensitivity of the tube and
    (iii) The deflection factor of the tube   7M

OR

10. a) Describe the working of integrating type digital voltmeter.   7M

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

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III B.Tech. I Semester Supplementary Examinations May 2017
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) What are the effects of distribution factor and coil span factor on induced E.M.F in an alternator   7M

   b) Distinguish between (**i**) Integral slot and fractional slot windings (**ii**) concentrated and distributed windings.   7M

OR

2. A 3-ɸ, 4-pole, 50 Hz, Y-connected alternators has a single layer full pitch winding with 21 slots per pole and two conductors per slot. The fundamental flux is 0.6 wb and air gap flux contains a third harmonic of 5% amplitude. Find the RMS values of phase E.M.F due to the fundamental, the third harmonic flux and total induced E.M.F.   14M

UNIT–II

3. a) With a neat circuit diagram explain how voltage regulation of an alternator can be estimated using ZPF method   7M

   b) Explain in brief two reaction theory as applied to salient pole alternators   7M

OR

4. a) From the vector diagrams, deduce an expression for the voltage regulation in a salient pole alternator.   7M

   b) With a neat circuit diagram explain how X_d and X_q of an alternator can be found experimentally.   7M

UNIT–III

5. a) What are the conditions to be fulfilled for successful parallel operation of alternators   7M

   b) Explain with a neat diagram the synchronization of two alternators using dark lamp method.   7M

OR

6. Two similar 13000 V, 3-ɸ alternators are operated in parallel on infinite bus bars. Each machine has an effective resistance and reactance of 0.05   and 0.5 respectively. When equally excited, they share equally a total load of 18 MW at 0.8 pf lagging. If the excitation of one generator is adjusted until the armature current is 400 A and the steam supply to its turbine remains unaltered, find armature current, the E.M.F and the pf of the other generator   14M

| **UNIT–IV** |

7. a) Explain with suitable vector diagrams the variation of current and power factor with excitation in a synchronous motor   7M

    b) Derive an expression for the mechanical power developed in synchronous motor in terms of load angle.   7M

OR

8. a) Explain in detail the V and Λ curves of a synchronous motor   7M

    b) A 2300 V, 3-ϕ, Y-connected synchronous motor has a resistance of 0.2   per phase and a synchronous reactance of 2.2   per phase. The motor is operating at 0.5 pf leading with a line current of 200 A. Determine the value of generated E.M.F per phase.   7M

| **UNIT–V** |

9. a) With a neat diagram explain the principle of operation and constructional features of capacitor start-capacitor run 1-ϕ induction motor   7M

    b) Explain the principle of operation and characteristics of a split phase motor   7M

OR

10. a) Briefly explain the difference between double revolving field theory and cross field theory as applied to single phase motors   7M

    b) Explain with neat diagram the principle of operation of AC series motor   7M

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Code: 4GC52

R-14

III B.Tech. I Semester Supplementary Examinations May 2017
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) Write an explanatory note on the multidisciplinary nature of environmental science?

   b) What are the major components of the Troposphere?

OR

2. a) Name and discuss the four major periods of growth of human population

   b) What is water pollution? Briefly discuss the sources of water pollution

UNIT–II

3. a) Differentiate between renewable and non –renewable natural resources?

   b) Discuss the uses and effects of over utilization of surface and ground water sources?

OR

4. a) Why is the concept of a food web in an ecosystem? How many food chains are there in that food web?

   b) Explain the Carbon cycle?

UNIT–III

5. a) Define the food chain. Name and explain various types of food chains with suitable examples?

   b) State the chief characteristic features of desert ecosystem?. And describe its structure and function?

OR

6. a) What is the 'Biodiversity'? Name and discuss the values that can be assigned to biodiversity?

   b) What do you understand by 'Conservation of Biodiversity'? State and explain the two basic approaches to the wild life conservation?

UNIT–IV

7. a) What is noise? What is its unit of measurement? What are the various effects of noise pollution?

   b) What is 'Solid -waste'? Discuss in brief the various types of solid-wastes/refuse?

OR

8. a) What is the object of waste water treatment? Name the various units of treatment employed in waste water treatment plant and state their function?

   b) Define the term air pollution. What are its economic effects?

UNIT–V

9. a) Write a note on Rain water Harvesting?

   b) Discuss, in brief, the salient feature of the Air 9Prevention and Control of Pollution) Act, 1981

OR

10. a) What is 'value education'? Discuss the concept of value education with the help of suitable examples?

    b) Briefly discuss the problems of 'Family Welfare Programme'

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III B.Tech. I Semester Supplementary Examinations May 2017
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)   Draw and explain differential amplifier with two Op-Amps.   7M
    b)   Draw and explain the Op-Amp ideal integrator. Mention its drawbacks. How these are overcome with Lossy integrator?   7M

OR

2   a)   Draw and explain an Instrumentation amplifier with Op-Amp.   7M
    b)   Draw and explain the Op-Amp ideal differentiator. Mention its drawbacks. How these are overcome with practical integrator?   7M

UNIT–II

3   a)   Draw and explain the Astable operation of 555 timer.   7M
    b)   Discuss any two applications of 565 PLL.   7M

OR

4   a)   Explain the working principle of Inverted R-2R DAC with a neat diagram.   7M
    b)   Explain the working principle of parallel comparator type ADC with a neat diagram.   7M

UNIT–III

5   a)   Draw the CMOS inverter transfer characteristics and explain the different regions of operation.   7M
    b)   Design a 3 input NOR gate and explain its operation.   7M

OR

6   a)   With neat sketches explain Transistor Transoistor logic (TTL).   7M
    b)   Discuss CMOS 40XX series-ICs – Specifications   7M

UNIT–IV

7   a)   Design a full adder using 8:1 multiplexer ICs.   7M
    b)   Design a BCD-to-Gray code converter using 8:1 multiplexers.   7M

OR

8   a)   Design a 10-bit parity checker using one 74180 and an EX-OR gate(7486)   9M
    b)   Explain the Combinational multipliers and mention their applications.   5M

UNIT–V

9   a)   Convert a T Flip-flop to a J-K Flip-flop.   7M
    b)   Design a synchronous decade counter to count in the Excess-3 code sequence.   7M

OR

10 a)   Explain the concept of Shift Registers and write their applications.   7M
    b)   Explain the CMOS 40XX series of IC counters.   7M

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Code: 4G253

III B.Tech. I Semester Supplementary Examinations May 2017
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 dynamic characteristics of a SCR   7M
   b) Explain any three commutation methods of a SCR   7M

OR

2. a) Explain the parallel operation of thyristors.   7M
   b) Briefly explain the voltage ratings of SCR   7M

UNIT–II

3. a) Explain the importance of pulse transformer in triggering circuits   7M
   b) Explain the triggering circuit which uses a pulse transformer as major component. Draw the necessary waveforms.   7M

OR

4. a) Briefly explain different cooling types of a SCR   7M
   b) Explain the improvement in dv/dt with the help of cathode short.   7M

UNIT–III

5. a) Explain the operation of half bridge converter and derive the necessary expressions.   7M
   b) Explain the effect of source inductance in a single phase converters.   7M

OR

6. a) Explain the operation of a non circulating mode of a dual converter with necessary waveforms.   7M
   b) Compare non-circulating and circulating mode of operation of dual converter.   7M

UNIT–IV

7. a) Briefly explain the different modes of operation of a single quadrant chopper with RL load.   7M
   b) Explain the time ratio control process of a chopper circuit with derivation.   7M

OR

8. a) Briefly explain the current commutated chopper circuit with necessary waveforms.   7M
   b) Explain the operation of four quadrant chopper.   7M

UNIT–V

9. a) What the improvements absorbed in modified McMurray Bedford inverter. Explain with neat circuit diagram and waveforms.   7M
   b) Briefly explain the pulse width modulation techniques.   7M

OR

10. a) Briefly explain the operation of A.C voltage controller with two SCR's for RL load, with neat waveforms.   7M
    b) Explain the bridge configuration of single phase cycloconverter.   7M

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R-14

Code: 4G252

III B.Tech. I Semester Supplementary Examinations May 2017
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 the expression for capacitance of a single phase or two wire transmission line.   7M

   b) Find the capacitance of phase to neutral per kilometer of a 3 phase line conductors of 2cm diameter placed at the corners of a triangle with sides 5m, 6m and 7m respectively. Assume that the line is fully transposed and carries balanced load,   7M

OR

2. a) Derive the expression for the inductance per phase of a 3-phase line with unsymmetrical spacing.   6M

   b) Explain about Skin and Proximity effects.   8M

UNIT–II

3. a) Derive the A, B, C, D parameters for medium transmission lines using nominal-T method.   8M

   b) Using the nominal- Π method, find the sending-end voltage of a 250 km, 3-phase, 50Hz, transmission line delivering 25MVA at 0.8 lagging power factor to a balanced load at 132kV. The line conductors are spaced equilaterally 3m apart. The conductor resistance is 0.11ohm/km and its effective diameter is 1.6cm.   6M

OR

4. a) Obtain the equivalent circuit of a long transmission line with necessary equations.   7M

   b) A single phase 60Hz transmission line is 370km long. The spacing between the conductors is 7.25m.The load on the line is 125MW at 215kV with 100% power factor. Find the voltage and current at the sending end.   7M

UNIT–III

5. a) With necessary circuits explain the procedure for travelling wave phenomenon for line terminated with short circuit.   8M

   b) Define attenuation, distortion coefficients.   6M

OR

6. Explain the procedure for travelling wave phenomenon for line terminated with T-junction and reactive junctions.   14M

UNIT–IV

7. a) Derive the expression for sag and tension when the supports are at equal heights. **8M**

   b) A transmission line conductor has a diameter 18.5 mm and weights 0.95 kg/m. The span is 270 meters. The wind pressure is 90 kg/m^2 of projected area with ice coating of 15mm. The ultimate strength of the conductor is 8000kg. Calculate the maximum sag if the factor of safety is 2 and ice weights 900 kg/m^3. **6M**

OR

8. a) Explain the phenomenon of corona. What are the factors that affect corona? **7M**

   b) Explain about stringing chart and sag template and give their applications. **7M**

UNIT–V

9. Explain briefly the following methods of grading of cables:

   a) Capacitance grading

   b) Inter sheath grading **14M**

OR

10. a) Calculate the capacitance and charging current of a 3 phase, single core, 33kV, 50Hz, 2km long cable has a core diameter of 2cm and a sheath diameter of 6cm. Relative permittivity of the insulation is 3. **9M**

    b) What are the advantages of underground cables over the over head transmission lines and classify the cables. **5M**

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