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B.Tech. (EE) 3rd Semester (G-Scheme)

Examination, December–2024

ELECTRIC CIRCUIT ANALYSIS

Paper–PCC-EE-201-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in all, selecting **one** question from each section. **Question No. 1 is compulsory.***

1. (a) Explain the KCL and KVL.

(b) What are the application of Thevenin Theorem ?

(c) Define Laplace Transform.

(d) Define Transfer Function.

(e) What do you mean by Initial and Final Condition ?

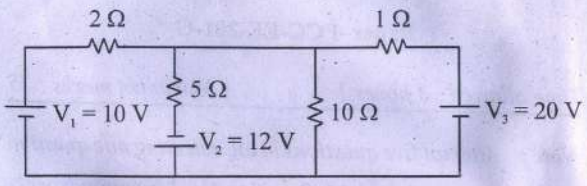
(f) Explain Z-Parameters two Port Network.

6×2.5=15

Section–A

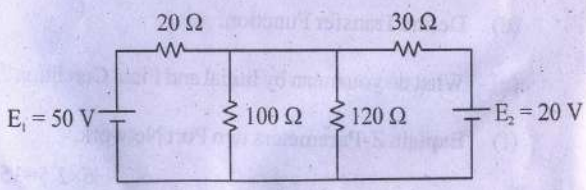
2. (a) State and prove the Maximum Power Transfer Theorem. 7.5

(b) Find the current through the 10 Ω resistor using Thevenin's Theorem. 7.5



3. (a) Explain supermesh and supernode analysis with example. 7.5

(b) Using Nodal method, find the current through 100 Ω. 7.5



Section–B

4. Derive the Expression for source Free Response of RL circuit. 15

5. Explain the Transient and Steady State Response of circuit in detail. 15

Section–C

6. (a) Check Whether the given polynomial $P(S) = S^3 + 2S^2 + 3S + 6$ is Hurwitz or not. 7.5

(b) Explain Positive real Function with Properties. 7.5

7. An impedance function is given by 15

$$Z(S) = \frac{S(S+3)(S+4)}{(S+2)(S+1)}$$

Find R–L Representation of

(i) Foster–1

(ii) Caver–II Form

Section–D

8. Explain the various inter-connection in two Port Network. 15

9. Explain the following terms : 15

(i) Cut-set Matrix

(ii) Tie-set Matrix

with Example.

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B.Tech. (EE) 3rd Semester G-Scheme

Examination, December-2024

ANALOG ELECTRONICS

Paper : PCC-EE-205-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : Question No. 1 is compulsory. *Attempt at least one question from each section.*

1. (a) Define P-N Junction diode.

(b) Why biasing is required?

(c) Define current mirror.

(d) Define MOSFET.

(e) Define gain in MOSFET.

(f) What is Small and Large signal operation?

(g) What is Barkhausen criterion?

(h) Define Peak detector.

(i) Define Inverting Amplifier. 15

Section–A

2. Compare the following : 15

   (a) Drift current and Diffusion current

   (b) Zener breakdown and Avalanche break down

   (c) Diffusion and Transition Capacitance

3. (a) Draw and explain input and output characteristics of CE Configuration. Also explain the various regions of operation. 10

   (b) Draw the small signal model of transistor. 5

Section–B

4. (a) Explain the operation of MOSFET in Enhancement made. 8

   (b) Draw and explain the high frequency model of MOSFET transistor. 7

5. (a) Draw and explain the frequency response of Common Source Amplifier. 8

   (b) Explain how MOSFET act as an Amplifier. 7

Section–C

6. (a) Explain the working of Inverting and non-inverting configurations. 8

   (b) Explain the working of differential Amplifier with active load. 7

7. (a) Derive an expression for the overall gain of a voltage series feedback Amplifier. 8

   (b) A –ve feedback of $\beta = 0.01$ is applied to an amplifier of gain 2000. Calculate the change in overall gain of feedback Amplifier if internal amplifier is subjected to a gain reduction of 10%. 7

Section–D

8. Explain the working of Op-Amp as : 15

   (a) ADC

   (b) Phase shift oscillator

   (c) Differential Amplifier

9. Explain how Op-Amp can be used as : 15

   (a) Hysteretic Comparator

   (b) Integrator

   (c) Triangular wave generator

B. Tech. (EE) 3rd Semester G-Scheme

Examination, December–2024

ELECTRICAL MACHINES-I

Paper-PCC-EE-209-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in all, selecting **one** question from each section. **Question Number 1 is compulsory.** All questions carry equal marks.*

1. (a) State Ampere's law. 6×2.5=15

(b) What is function of commutator in a DC motor?

(c) What is purpose of compensating winding in DC machines?

(d) Explain different losses in transformer.

(e) Write the principle of dc motor.

(f) Draw equivalent circuit diagram of transformer at no load and full load.

Section-A

2. (a) Explain the concept of flux linkage and current characteristic of magnetic material. 7.5

(b) Define the following terms-MMF, flux, reluctance, inductance, linear and non-linear magnetic circuit. 7.5

3. Discuss the concept of B-H curve? Explain with graph retentivity and coercivity of ferromagnetic material. 15

Section-B

4. (a) A 230 V dc shunt motor has an armature resistance of 0.1Ω and shunt field resistance of 275 Ω. It runs at speed of 1000 rpm when drawing an armature current of 75 A. Calculate the additional resistance to be inserted in the field circuit to raise the motor speed to 1200 rpm at an armature current of 125 A. 7.5

(b) Derive torque equation of dc motor. 7.5

5. Explain with suitable diagram pattern of lap winding and wave winding in dc machine. Also define pitch factor, distribution factor, front pitch, back pitch, resultant pitch. 15

Section-C

6. Explain in detail Hopkinson test for dc motor. Also formulate efficiency of dc motor and generator. 15

7. Explain V-I and torque-speed characteristics of separately excited, shunt and series dc motor. 15

Section-D

8. A 50 kVA, 2200/220 V single phase transformer gave following result : 15

OC Test: 220V, 5A, 405W

SC Test: 95V, 20A, 805 W

(a) Determine different parameters from OC and SC test.

(b) Draw equivalent circuit of transformer.

(c) Calculate efficiency of Transformer at half load and full load at unity power factor.

9. (a) What is Auto transformer? Explain how saving of copper is done in an auto transformer. 7.5

(b) Explain no-load and on-load tap changing of transformers. 7.5

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B. Tech. (EE) 3rd Semester G-Scheme

Examination, December, 2024

MEASUREMENT AND INSTRUMENTATION

Paper : PCC-EE-210-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note: *Attempt **five** questions in all, **Q. 1 is compulsory**. Attempt **four** more questions from the **section A, B, C and D** by selecting at least **one** question from each section.*

1. (a) Define the terms Accuracy and Precision.

(b) Define the term Transducer.

(c) Describe errors in measuring instruments.

(d) Define Absolute instrument.

(e) Describe about PMMC instrument.

(f) Explain Shape of scale of induction type energy meter.

(g) What is Compensation in energy meter?

(h) What are the advantages of moving iron instruments?

(i) What are the advantages of Maxwell's Inductance Bridge?

(j) What are the Limitations of Wheatstone bridge? 10×1.5=15

Section-A

2. (a) Draw the block diagram of Generalized instrument. And explain it. 10

(b) Explain the following terms in brief : 5

(i) Sensitivity

(ii) Resolution

(iii) Threshold

3. (a) Draw Block diagram and working of function generator. 10

(b) Describe the basic schemes for the measurement of displacement. 5

Section-B

4. (a) What is the classification of Instruments Based upon Principle of operation? 7.5

(b) Explain the construction and working of Electrodynamic type instruments. 7.5

5. Explain Construction, working, advantages and disadvantages of attraction type and repulsion type moving iron instruments. 15

Section-C

6. Explain Construction, Operating Principle, Torque equation, Shape of scale, Errors, Advantages and Disadvantages of Electrodynamic type Wattmeter. 15

7. Explain Construction, operating principle, Torque equation, Shape of scale, Errors, Advantages and Disadvantages of Electrical Resonance Type Frequency meter. 15

Section-D

8. Write short note on : 15

(a) Kelvin's double bridge method

(b) Weins bridges

9. What are the Difficulties in high resistance measurements? Explain Measurement of high resistance by direct deflection and loss of charge method. 15

B.Tech. (EE) 3rd Semester (G-Scheme)

Examination, December-2024

ENGINEERING MECHANICS

Paper -ESC-EE-202-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : ***Question No. 1 is compulsory.*** *Attempt* ***five*** *questions in total, selecting* ***one*** *question from each section. All questions carry equal marks.*

1. Write short notes on:

(a) Principal axes

(b) Centre of gravity

(c) Perpendicular Axes Theorem

(d) Rolling coin

(e) Different types of Loads

(f) Laws of Coulomb friction $6 \times 2.5 = 15$

Section-A

2. Explain vectors, tensors and coordinate systems in detail. Discuss Vector and tensor algebra. 15

3. What is Euler's theorem and Euler angle? Explain three dimensional rotation? 15

Section-B

4. An I-section has the following dimensions:

   (i) Bottom flange = 300 mm × 300 mm

   (ii) Top flange = 150 mm × 50 mm

   (iii) Web = 300 m × 50 mm

   Determine the position of centre of gravity of the section. 15

5. Determine the moment of inertia of a triangle with respect to its base. 15

Section-C

6. What is Gyroscopes? Explain the effect of Gyroscopic Couple on a naval ship during Rolling? 15

7. Explain free body diagram. Give examples on modelling of supports and joints. 15

Section-D

8. Prove that a hallow shaft of the same weight and material as that of a solid shaft can resist more torque. 15

9. Derive the relationship between load intensity, shear force and Bending Moment. 15

B.Tech. 3rd Semester (Common for all Branches)
G-scheme Examination, December-2024
UNIVERSAL HUMAN VALUES-II : UNDERSTANDING HARMONY
Paper - MC-UHV-II

Time allowed : 3 hours] *[Maximum marks : 75*

Note : Question No. 1 is compulsory. *Attempt* ***five*** *questions, selecting* ***one*** *question from each unit.*

1. Write note on : 6×2.5=15

(a) Causes of unhappiness

(b) Needs of consciousness

(c) Affection

(d) Humane society

(e) Natural acceptance

(f) Prosperity

Unit-I

2. (a) What are qualities of a person living with human consciousness? 5

(b) What is need of self-exploration? Discuss the content and process of self exploration using well labelled diagram. 10

3. Diagrammatically, differentiate between animal and human consciousness. How does this transformation occur in human beings? 15

Unit-II

4. (a) What is need of Self and program of self ? How does self uses body as instrument? 10

(b) What do you understand by harmony in self and body? How it can be achieved? 5

5. (a) How do the conduct of human being affected by motivation of imagination? What is pure self ? 7.5

(b) Is relationship based on self or body? Elaborate four aspects to understand about relationships. 7.5

Unit-III

6. (a) Discuss the participation of human being in entire existence. 10

(b) What is minimum content of respect? 5

7. (a) Describe the details of four orders in nature? 7.5

(b) What are the dimensions to achieve harmony in society? 7.5

Unit-IV

8. What is human goal? What are dimensions of human order and its scope? 15

9. (a) What is role of right understanding in emergence of human values? 7.5

(b) What are salient features characterizing professional ethics? 7.5

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B.Tech. (EE) 3rd Semester (G-Scheme) Examination,

November–2023

ELECTRIC CIRCUIT ANALYSIS

Paper–PCC-EE-201-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt any **five** questions in total, selecting at least **one** question from each section. **Question No. 1 is compulsory.***

1. (i) Write down the application of compensation theorem.

(ii) Write down the condition of supernode.

(iii) Write brief about the Reciprocity theorem.

(iv) What do you mean by fundamental cut set matrix in graph theory ?

(v) Write down the odd admittance parameter equation in two port network.

(vi) Explain the concept of critically damped in second order.

(vii) Write brief about mutual coupled circuit.

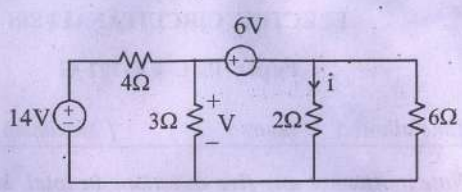
(viii) Why we need inverse laplace transform ?

(ix) Write brief about transient response.

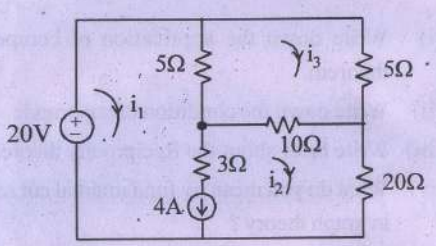
(x) Explain the concept of duality in network. 15

Section–A

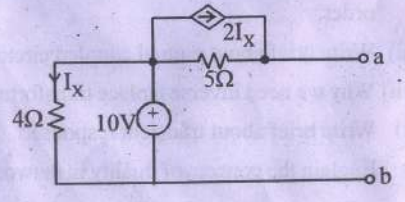
2. (i) Find v and (i) in the circuit given below : 7.5



(ii) Use Mesh analysis to determine i_1, i_2 and i_3 in the circuit given below : 7.5

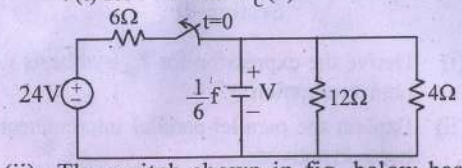


3. Using Norton's theorem, find R_N and I_N of the circuit given below at terminal ab. 15

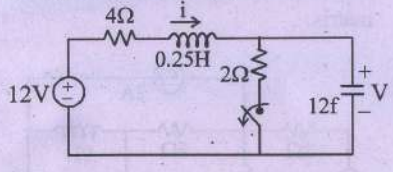


Section–B

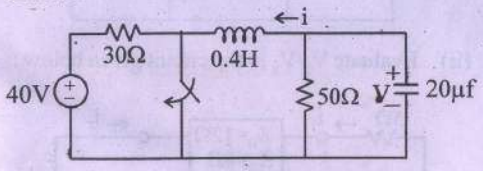
4. (i) If the switch as given below fig. open at t = 0 find V(t) for $t \geq 0$ and $W_c(0)$ 7.5



(ii) The switch shown in fig. below has been closed for a long time. It is open at t = 0, find i (0^+), V (0^+) 7.5



5. Find V(t) for $t \geq 0$ in the RLC circuit as shown in fig. below : 15



Section–C

6. Synthesize the network, if $Z(S) = \frac{S^5 + 5S^3 + 4S}{S^4 + 3S^2 + 1}$ as Cauer-I form. 15

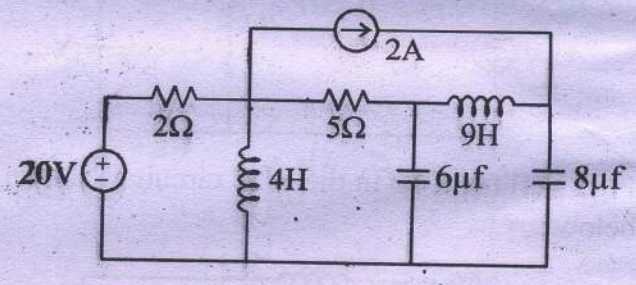
7. Test for p.r.f. $f(S) = \dfrac{2S^2 + 2S + 1}{S^3 + 2S^2 + S + 2}$ 15

Section–D

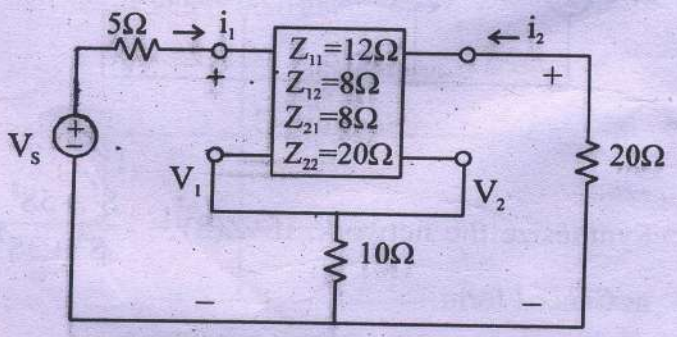
8. (i) Derive the expression for Z_{21} synthesis with R-ohm termination. 7.5

(ii) Explain the parallel-parallel interconnection in two port network. 7.5

9. (i) In the circuit given below, determine the fundamental loop matrix and fundamental cut set matrix. 7.5



(ii) Evaluate V_2/V_s in the circuit given below : 7.5



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B.Tech. (EE) 3rd Semester (G-Scheme)

Examination, November-2023

ELECTRICAL MACHINES-I

Paper - PCC-EE-209-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in all. selecting **one** question from each Unit. **Question No. 1 is compulsory.** All questions carry equal marks.*

1. Explain the following: 6×2.5=15

(a) What causes over heating of commutator in DC machine?

(b) How energy can be stored or retried from a magnetic circuit?

(c) How does change in frequency affect the operation of a given transformer?

(d) What are the possible causes excessive sparking at brushes in a DC motor?

(e) Inrush current.

(f) Methods of excitation of DC machine.

Unit-I

2. State and explain Ampere's law. Using the same law, find the magnetic intensity (H) for an infinite line current. 15

3. Draw and explain different zone of B-H curve for a magnetic material. 15

Unit-II

4. Draw the back emf equation and induced emf in armature coil for DC machine. 15

5. Explain commutation of DC machine. What results in poor commutation? Also explain methods of improving commutation. 15

Unit-III

6. Draw V-I and torque speed characteristics of separately excited and series motor. 15

7. Draw and explain the circuit diagram of different types of DC generators. 15

Unit-IV

8. Why equivalent circuit of transformer is required? Draw and explain equivalent circuit of single-phase transformer in details. 15

9. A 10KVA, 220/110V transformer has maximum efficiency 96% at 0.8 power factor lagging it core is 100W and full load regulation at 0.8 power factor lagging is 5% . Find the efficiency and regulation at 80% full load, 0.9 power factor lagging. 15

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B.Tech. 3rd Semester (Electrical Engg.) (G-Scheme)

Examination, November-2023

ANALOG ELECTRONICS

Paper - PCC-EE-205-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt any **five** questions in all, selecting one question from each Unit. **Question No. 1 is compulsory.** All questions carry equal marks.*

1. Explain the following: 6×2½=15

(a) Write the applications of P N Junction diode.

(b) Explain the P N junction diode act as a rectifier.

(c) Why is CE configuration preferred over the other configuration?

(d) Define voltage-to-current converter.

(e) Explain in brief zero crossing detector.

(f) Discuss the advantages of negative feedback.

Unit-I

2. (a) Explain in detail the voltage-current (V-I) characteristics of a diode. 10

   (b) Explain the working of zener diode. 5

3. (a) Sketch the input and output characteristics of CE configuration of transistor and explain the biasing operation. 10

   (b) Explain in brief BJT act as a switch. 5

Unit-II

4. Explain in detail the construction, operation and characteristics of n-channel enhancement MOSFET. 15

5. (a) Differentiate between the Depletion MOSFET and Enhancement MOSFET. 10

   (b) Discuss the working of small signal model of MOSFET. 5

Unit-III

6. (a) Derive-n expression of inverting and non-inverting configuration of operational amplifier. 10

   (b) Explain the concept of virtual ground. 5

7. Analyze the different feedback configurations and derive the expression of voltage gain, input resistance and output resistance for voltage shunt feedback amplifier. 15

Unit-IV

8. Explain in detail the following: 15

   (a) Instrumentation Amplifier

   (b) Lead and Lag compensator using op-amp

9. Explain how an op-amp can be used as integrator? Also derive the expression for the output and give the applications. 15

B.Tech. (EE) 3rd Semester (G-Scheme)

Examination, November-2023

MEASUREMENT AND INSTRUMENTATION

Paper - PCC-EE-210-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in all, selecting **one** question from each Unit. **Question No. 1 is compulsory.** All questions carry equal marks.*

1. Explain the following : 6×2.5=15

(a) Absolute instruments

(b) Transducers

(c) Thermocouple

(d) Accuracy

(e) Sensitivity

(f) Indicating instruments

Unit-I

2. Describe three forces or torques required for proper operation of indicating instruments. 15

3. Explain construction working of CRO. 15

Unit-II

4. Explain construction working of MOVING IRON type instrument also derive its deflection torque equation and advantages & disadvantages. 15

5. The resistance of a moving coil voltmeter is 12000 Ω. The moving coil has 100 turn and is 4cm long and 3cm wide. The flux density in the air gap is 6×10^{-2} wb/m^2. Find the deflection produce by the 300V if the spring control gives the deflection of one degree for a torque 25×10^{-7} Nm. 15

Unit-III

6. With the help of neat diagram explain construction working of dynamometer type wattmeter. 15

7. Write short note on: 15

   (i) Frequency meter

   (ii) Compensation and creep in energy meter

Unit-IV

8. Explain the Wheatstone bridge with its limitation. 15

9. Explain the circuit and phasor diagram of Maxwell's induction capacitance bridge. 15

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B.Tech. (EE) 3rd Semester (G-Scheme)

Examination, November-2023

ENGINEERING MECHANICS

Paper - ESC-EE-202-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : ***Question No. 1 is compulsory.*** *Attempt total* ***five*** *questions selecting one question from each Unit. All questions carry equal marks.*

1. Write short notes on :- 6×2.5=15

(a) Coordinate System

(b) Euler Angles

(c) Parallel Axes Theorem

(d) Free Body Diagram

(e) Centroid

(f) Angle of Repose

Unit-I

2. Explain symmetric tensor, Anti-symmetric tensor Eigen values and Principal axes in details. 15

3. What is Euler's theorem and Euler angle? Explain Coordinate transformation of vectors and tensor. 15

Unit-II

4. Describe the various methods of finding out the centre of gravity of a body. 15

5. Find the moment of inertia of a T-section having flange and web both 120 mm×30mm about X-X axis passing through the centre of gravity of the section. 15

Unit-III

6. What is the effect Gyroscopic Couple on a naval ship during Rolling? 15

7. Explain free body diagram. Give examples on modelling of supports and joints. 15

Unit-IV

8. Derive the Torsion equation applied to circular shafts. 15

9. Draw shear force and bending moment diagram for SSB, AB of span 9m carrying ud/ 1800 N/m run on the part CD of span so that AC= 2m, CD= 4m and BD= 3m. 15