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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

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

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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 retrieved 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?

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[P.T.O.]

(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

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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 its core loss 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

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 $120 \text{ mm} \times 30 \text{ mm}$ 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 udl 1800 N/m run on the part CD of span so that AC= 2m, CD= 4m and BD= 3m. 15

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

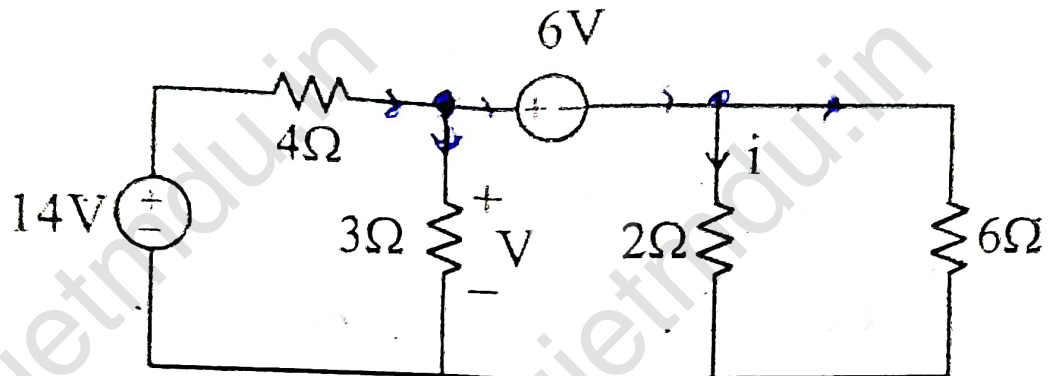
Note : Attempt any five questions in total, selecting at least one question from each section. Question No. 1 is compulsory.

- I.
- (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.

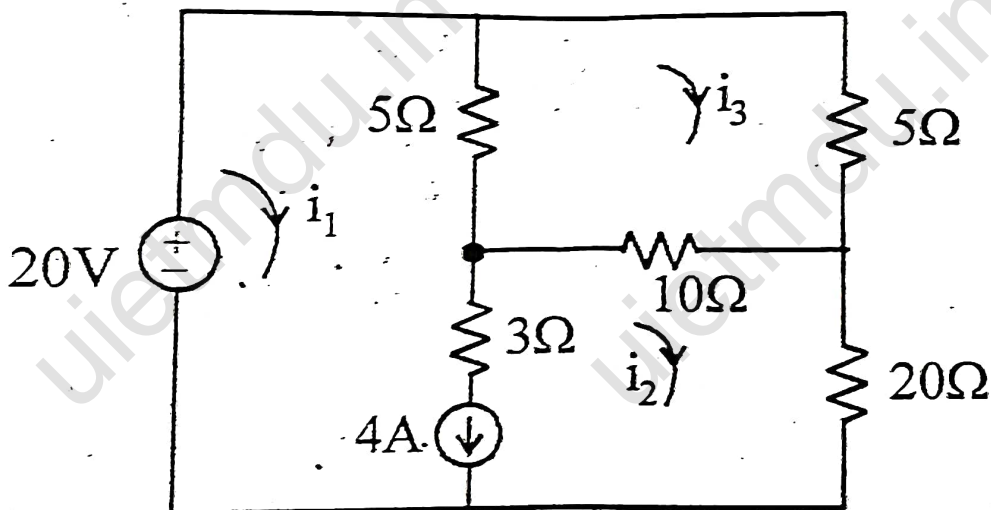
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Section-A

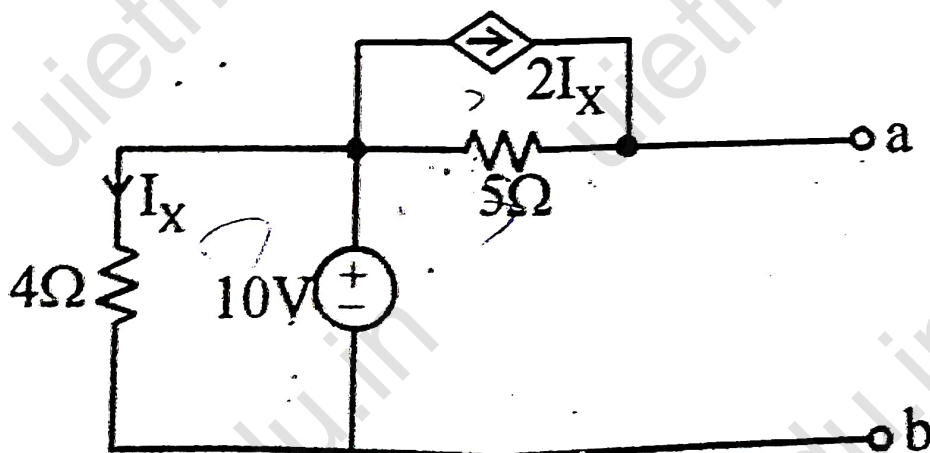
2. (i) Find v and i in the circuit given below: 7.5



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

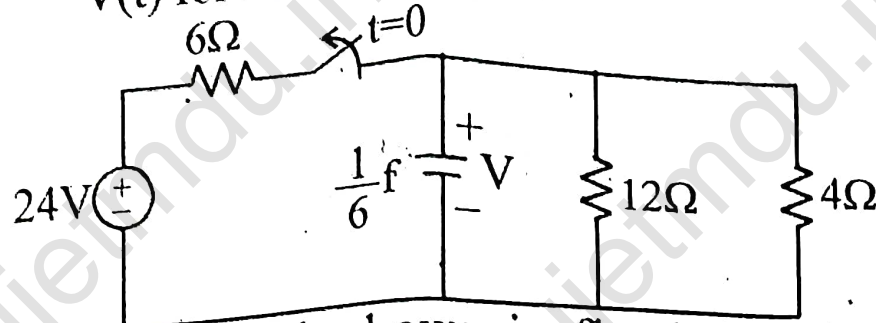


3. Using Norton's theorem, find R_N and I_N of the circuit given below at terminal ab. 15

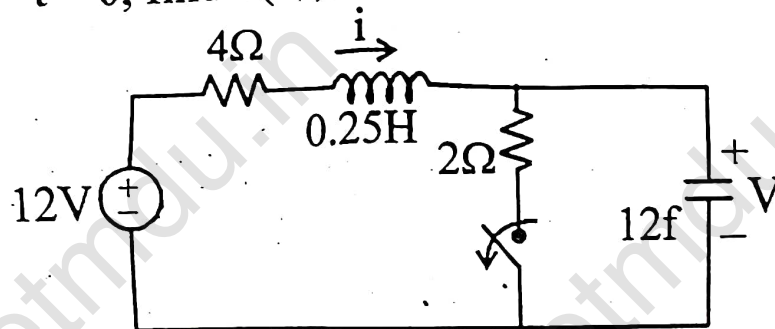


Section-B

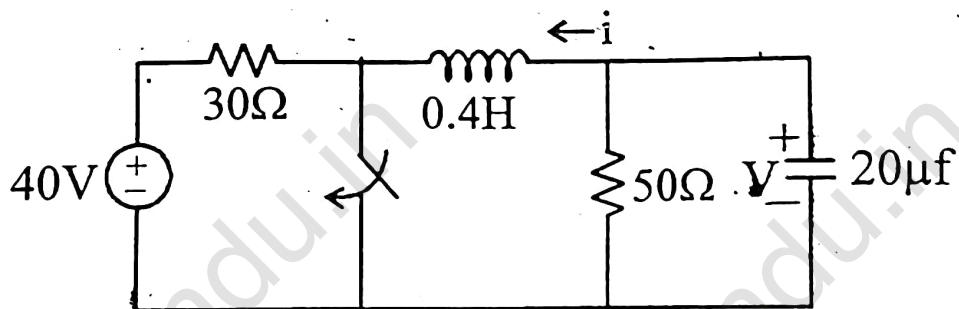
4. (i) If the switch as given below fig. open at $t=0$ find $V(t)$ for $t \geq 0$ and $W_c(0)$ 7.5



- (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



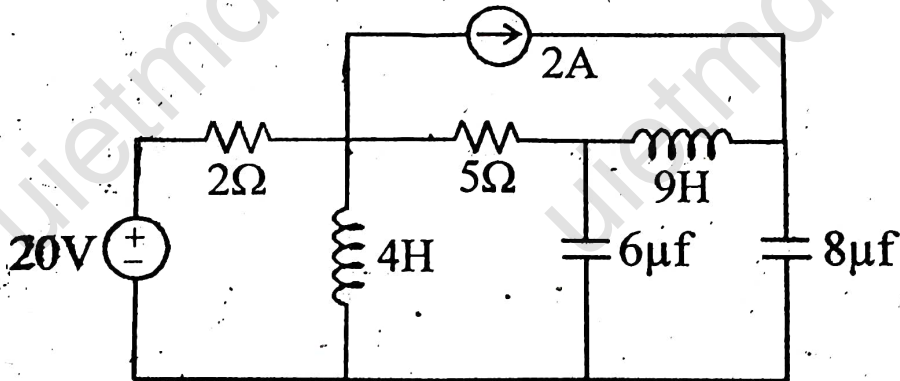
Section-C

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

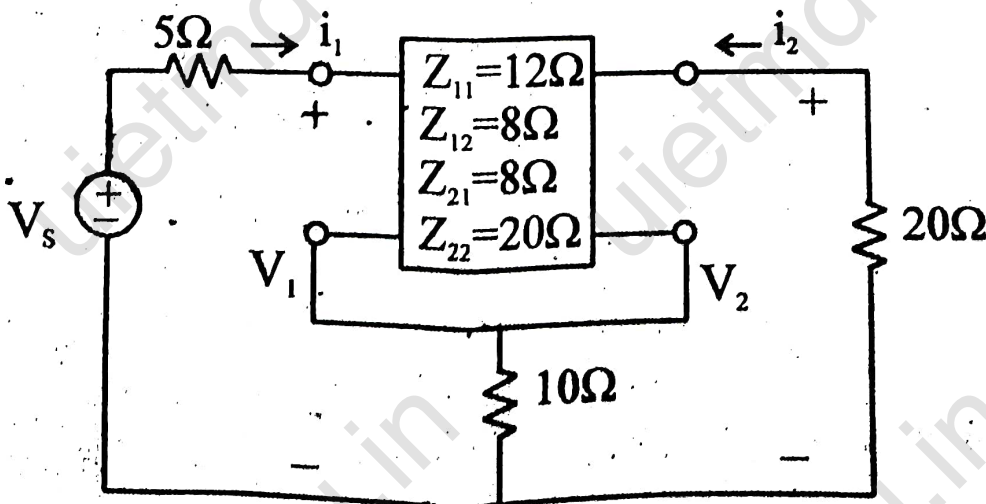
7. Test for p.r.f. $f(S) = \frac{2S^2 + 2S + 1}{S^3 + 2S^2 + S + 2}$ 15

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. 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: $6 \times 2\frac{1}{2} = 15$
- (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 an 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