



Total No. of Printed Pages – 4

AEUD
ELECTRICAL ENGINEERING
PAPER – I
SUBJECT CODE : 12

Full Marks : 200

Time : 3 Hours

Instructions For Candidates :

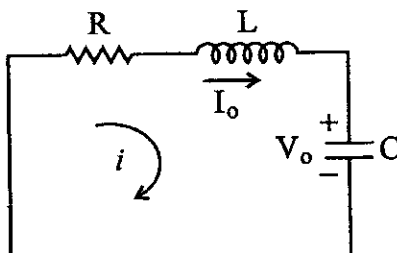
Please read each of the following instructions carefully before attempting questions.

- (1) *Answers must be written in **ENGLISH** only.*
- (2) *The question paper contains a total of 8 questions in **TWO** Sections : Section-A and Section-B. (**FOUR** questions in each section)*
- (3) *Question No. 1 of Section 'A' and Question No. 5 of Section 'B' are compulsory.*
- (4) *Candidates have to attempt another **THREE** questions from remaining **SIX** questions choosing atleast **ONE** question from each section.*
- (5) *Assume suitable data if found necessary.*
- (6) *Wherever any assumption be made for answering a question, they must be clearly indicated.*
- (7) *Marks carried by a question / section is indicated against it.*
- (8) *Unless struck off, attempt of question shall be counted even if attempted partly.*
- (9) *Any page or portion of the page left blank in the Answer Booklet must be clearly struck off.*

SECTION – A

Marks

1. (A) Find the response of source free series RLC circuit for following cases referring to circuit below, which has a DC source. Series RLC circuit shown is being excited by the energy initially stored in the capacitor and inductor. The energy is represented by the initial capacitor voltage (V_o) and initial inductor current (I_o).





Marks

(i) Find out the governing relations for the response and express the roots using characteristic equation.

(ii) Write the form of solution in case of underdamped response.

8

(B) What is Gauss's law in relation to electric field? Explain. Also write its mathematical form.

8

(C) What are the different classes in magnetic behavior of materials?

8

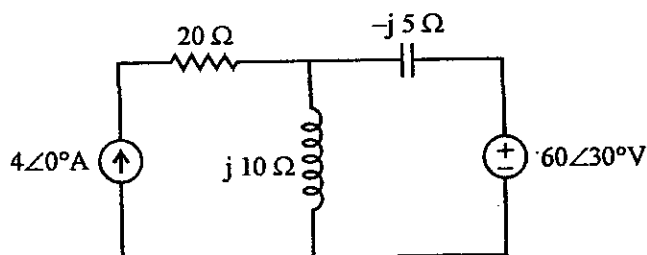
(D) What is a flowchart? Point out 3 advantages of using a flowchart in programming?

8

(E) What is Wheatstone bridge? Explain its principle, with suitable diagram.

8

2. (A) Refer the circuit below :



Determine average power generated by each source and average power absorbed by each element.

25

(B) Explain six symbols used in flowchart with their meaning.

15

3. (A) Describe with suitable energy band diagrams, three major classification of materials.

15

(B) How is piezoelectricity generated? Explain. Give three examples for such materials.

15

(C) What are the functions of dielectric used in capacitors?

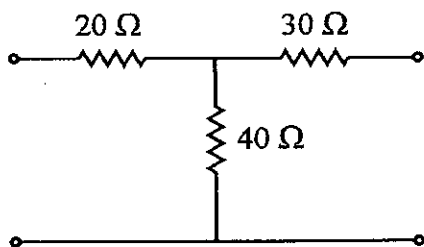
10



4. (A) What is the advantage of using Kelvin bridge over Wheatstone's bridge ?
Explain its principle of operation with neat diagrams. 20
- (B) What is an algorithm ? Define the steps to construct an algorithm, using a suitable example. 10
- (C) What is telemetry ? What is a telemeter, and which technologies are used in such devices ? 10

SECTION – B

5. (A) Find the z-parameters of the network below :



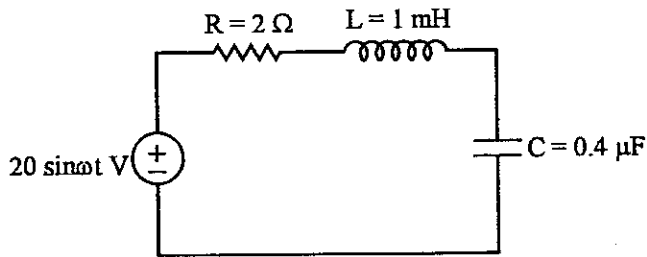
- 8
- (B) Explain ferro and ferri magnetism, with suitable diagrams, and give two examples for such materials. 8
- (C) What is displacement current ? Express mathematically. 8
- (D) Write down algorithm & draw flowchart to find sum of series $1+3+5+\dots+N$, where N is positive odd integer. 8
- (E) What are electric transducers ? Explain active and passive transducers with one example each. 8
6. (A) Write down the expression for source – free Maxwell's equations and explain its significance. 15
- (B) Define superconductivity. What is the cause of this phenomenon ? Give two examples of such materials. 15
- (C) Explain Hall effect, and what information does it provide ? 10



Marks

7. (A) In the circuit, find the resonant frequency and the half-power frequencies.

20



- (B) Draw the block diagram for digital multi-meter using successive approximation ADC. Briefly explain its operation, using a simple example.

20

8. (A) Explain how gradient derives a vector field from scalar field with simple examples (for 3D and 2D). Express the general form for 3-D gradient. 15
- (B) Explain structured programming. Write down three advantages and disadvantages. 15
- (C) Write down five properties of Hurwitz's polynomial. 10
