Total Pages : 32

13 - II

13

Optional Paper

Electrical Engg.

Paper – II

Time : 3 Hours | Maximum Marks : **200**

IMPORTANT NOTES / महत्वपूर्ण निर्देश

(A) Please fill up the OMR Sheet of this Question Answer Booklet properly before answering. Please also see the directions printed on the obverse before filling it.
प्रश्नोत्तर पुस्तिका में प्रश्न हल करने से पूर्व उसके संलग्न ओ.एम.आर. पत्रक को भली प्रकार भर लें । उसे भरने हेतु उसके पृष्ठ भाग पर मुद्रित निर्देशों का अध्ययन कर लें ।

(B) The question paper has been divided into three Parts - **A, B** and **C**. The number of questions to be attempted and their marks are indicated in each part.
प्रश्न–पत्र अ, ब और स तीन भागों में विभाजित है । प्रत्येक भाग में से किये जाने वाले प्रश्नों की संख्या और उनके अंक उस भाग में अंकित किये गये हैं ।

(C) Attempt answers in **English**.
उत्तर अंग्रेजी भाषा में दीजिये।

(D) Answers to all the questions of each part should be written continuously in the script and should not be mixed with those of other parts. In the event of candidate writing answers to a question in a part different to the one to which the question belongs, the question will not be assessed by the examiner.
उत्तर पुस्तिका में प्रत्येक भाग के समस्त प्रश्नों के उत्तर क्रमवार देने चाहिये तथा एक भाग में दूसरे भाग के उत्तर नहीं मिलाने चाहिये । एक भाग में दूसरे भाग के प्रश्न के उत्तर लिखे जाने पर ऐसे प्रश्न को जाँचा नहीं जा सकता हैं ।

(E) The candidates should not write the answers beyond the limit of words prescribed in parts **A, B** and **C** failing this the marks can be deducted.
अभ्यर्थियों को भाग अ, ब और स में अपने उत्तर निर्धारित शब्दों की सीमा से अधिक नहीं लिखने चाहिये। इसका उल्लंघन करने पर अंक काटे जा सकते हैं ।

(F) **In case the candidate makes any identification mark i.e. Roll No./Name/Telephone No./Mobile No. or any other marking either outside or inside the answer book, it would be treated as resorting to using unfair means. In such a case his candidature shall be rejected for the entire examination by the Commission.**
अभ्यर्थी द्वारा उत्तर पुस्तिका के अंदर अथवा बाहर पहचान चिन्ह यथा – रोल नम्बर / नाम / मोबाईल नम्बर / टेलीफोन नम्बर लिखे जाने या अन्य कोई निशान इत्यादि अंकित किये जाने को अनुचित साधन मान जायेगा। आयोग द्वारा ऐसा पाये जाने पर अभ्यर्थी की सम्पूर्ण परीक्षा में अभ्यर्थिता रद्द कर दी जायेगी ।

BLANK PAGE

PART – A

Marks : 40

Note : Attempt all the **twenty** questions. Each question carries 2 marks. Answer should not exceed 15 words.

1 Define term accuracy and precision.

2 What is Hall Effect?

3 Explain working principle of thermocouple instruments.

4 What are properties of Ideal op-amp?

5 What is a cutset?

6 Define peak factor.

7 A 3-phase, 4 pole, 50 Hz, induction motor runs at 1,460 rpm. Determine its percentage slip.

8 Find the sum of binary numbers 101-101 and 110-100.

9 Convert the decimal number 423 into hex.

10 Find the inverse Laplace transform of function $F(s)=\frac{1}{s(s+2)}$

11 In signal flow graph, the forward path is defined as

(a) path from the input node to the output node

(b) traversal of branches in the direction of arrows

(c) traversal of outgoing branches from the input node

(d) path from the input node to the output node including all touching loops.

12 What is a flip flop?

13 What are three different phases in the execution process of microprocessor?

14 What is accumulator?

15 What are stack operations?

16 What is the effect of leakage flux?

17 What is optical transducer?

18 Explain function generator.

19 What are fast recovery diodes? Give its uses.

20 Give applications of IGBT.

PART – B

Marks : 60

Note : Attempt all the **twelve** questions. Each question carries **5** marks. Answer should not exceed **50** words.

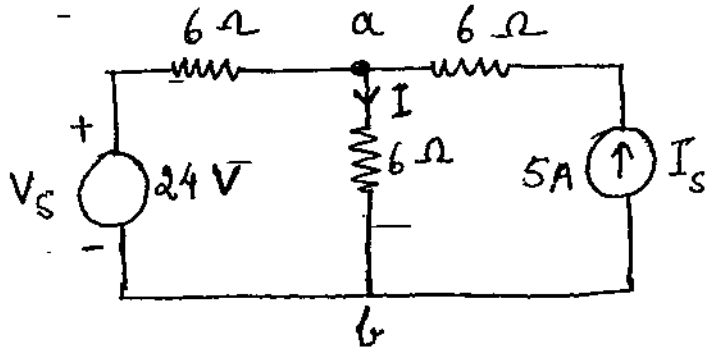
21 Explain electronic Multimeter.

22 Derive the equations of balance for Wein's bridge.

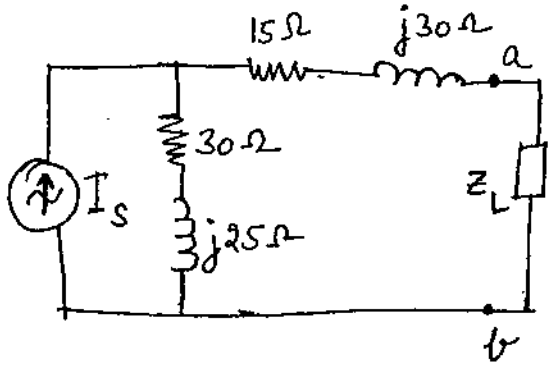
23 What are Hurwitz polynomials ? Write down the properties of Hurwitz polynomial.

24 Describe the parts of CRT with the help of diagram (Cathode Ray tube)

25 Determine the current I in the network shown in figure by the principle of superposition.



26 State Maximum Power Transfer Theorem for AC networks. Determine the load Z_L for maximum power transfer in the network shown.



27 What is Multiplexer? Explain 2-to-1 line multiplexer with the help of diagram.

28 Write down some applications of Power Electronics.

29 Give advantages and disadvantages of two Wattmeter Method.

30 What are main features of firing circuits for thyristors?

31 What are series inverters? Explain Basic Series Inverter.

32 A T section low pass filter has series inductance 80 mH and shunt capacitance 0.022 μF. Determine the cutoff frequency and nominal design impedance. Also design an equivalent π section.

PART – C

Marks : 100

Note : Attempt any 5 questions. Each question carries **20** marks. Answer should not exceed **200** words.

33 Explain the working principle and constructional details of single phase energy meter (Induction type). Give also diagrams for registering mechanism.

34 Explain the principle of Chopper operation. Give the various control strategies for varying duty cycle.

35 What are the time domain quantities which characterise a transient response (of second order system). Derive the expression for rise time (t_r).

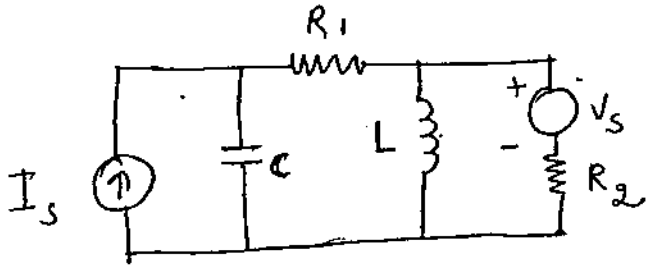
36 Give step by step procedure to draw Bode plot. Calculate corner frequencies for the following :

(i) $G(s)=\frac{5}{1+2s}$

(ii) $G(s)=\frac{2}{1+5s}$

(iii) $G(s)=10(1+4s)^2$

37 What do you mean by tree and its properties. Define twigs, co tree and links. Draw the graph of the network shown. How many trees are possible for this graph. Draw the trees.



38 Explain dual slope ADC.. What are its advantages and disadvantages. For a particular dual slope ADC (Analog to Digital Convertor), T_1 is 83.33 ms and the reference voltage is 100 mV. Calculate t_2 if (i) V_i is 100 mV and (ii) 200 mV.

39 Explain the types of interrupts in brief in 8085 microprocessor. Explain hardware interrupts in 8085 with the help of suitable diagrams.

SPACE FOR ROUGH WORK / रफ कार्य के लिए जगह