PART - I

Paper Code
06
Subject
Electrical Engg. - II

300239

PART - II

Subject : Electrical Engg. -II

300239

Paper Code:	06
Total Pages :	
Time	**3 Hours**
Maximum Marks :	200

<u>TO BE FILLED BY THE CANDIDATE</u>

Roll No. (In words)	
Name of the candidate	
Date of Birth (DD/MM/YYYY)	
Father's Name	
Signature of the candidate	
Date of Examination	

Roll No.

⓪	⓪	⓪	⓪	⓪	⓪
①	①	①	①	①	①
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⑨	⑨	⑨	⑨	⑨	⑨

Invigilator must check the Roll No. and Photo ID. of the candidate, then Sign. here :

<u>TO BE FILLED BY INVIGILATOR</u>

If candidate found using unfair means them Invigilator should fill up this bubble with black/blue ball pen & report to the Centre Superintendent:

○

1430_H2C-2

IMPORTANT NOTES
महत्त्वपूर्ण निर्देश

(A)   Please fill up the OMR Sheet of this Question-Answer Booklet properly before answering.

प्रश्नोत्तर पुस्तिका में प्रश्न हल करने से पूर्व उसके संलग्न ओ.एम.आर. पत्रक को भली प्रकार से भर लें ।

(B)   The question paper is divided into different unit and parts. The number of questions to be attempted and their marks are indicated in each unit and parts.

प्रश्न-पत्र विभिन्न यूनिट एवं भागों में विभाजित है । प्रत्येक यूनिट एवं भाग में से किये जाने वाले प्रश्नों की संख्या और उनके अंक उस यूनिट एवं भाग में अंकित किये गए हैं ।

(C)   Attempt answers either in **Hindi or English**, not in both. For Language Papers, answer in concerned language and script, unless directed otherwise to write in Hindi or English specifically.

उत्तर **अंग्रेजी या हिन्दी** भाषा में से किसी एक में दीजिये, दोनों में नहीं । भाषा विषयक प्रश्नों के उत्तर उनकी संबद्ध भाषा व लिपि में ही दिए जाएँ, जब तक कि प्रश्न विशेष के लिए अलग से हिंदी या अंग्रेजी में उत्तर देने के लिए न लिखा गया हो ।

(D)   The candidates should not write the answers beyond the prescribed limit of words; failing this, marks will be deducted.

अभ्यर्थियों को अपने उत्तर निर्धारित शब्दों की सीमा से अधिक नहीं लिखना चाहिए । इसका उल्लंघन करने पर अंक काटे जायेंगे ।

(E)   Please write answers only in the prescribed space of booklet. Do not write any mark of identity inside the Answer Script (including Paper for rough work) i.e. name, address, telephone number, Name of God etc. or any irrelevant words other than the answer of question. Such act will be treated as unfair means. The Commission may also deduct 5 marks from the marks obtained, if Roll Number is not filled correctly on the O.M.R. Sheet.

किसी भी प्रश्न का उत्तर प्रश्नोत्तर पुस्तिका में निर्धारित स्थान पर ही लिखें । प्रश्नोत्तर पुस्तिका (रफ़ कार्य के पृष्ठ सहित) के अंदर कहीं पर भी अपना नाम, रोल नंबर अथवा अन्य कोई पहचान चिन्ह यथा -- प्रश्नोत्तर में नाम, पता, दूरभाष नंबर, देवताओं के नाम अथवा अन्य कोई भी प्रश्नोत्तर से असम्बंधित शब्द, वाक्य एवं अंक आदि न लिखें । ऐसा करने पर आयोग द्वारा इसे अनुचित साधन अपनाने का कृत्य माना जायेगा । ओ.एम.आर. पत्रक पर रोल नम्बर का त्रुटिपूर्ण अंकन करने पर आयोग द्वारा उसके प्राप्तांकों में से 5 अंक भी काटे जा सकते हैं ।

(F)   Candidates are directed that they should not write (answer) out side the border line in every page. Answer written out side the border line will not be checked by the Examiner.

अभ्यर्थियों को निर्देशित किया जाता है कि प्रश्नोत्तर पुस्तिका में प्रत्येक पृष्ठ में बनाई गई बार्डर लाईन से बाहर प्रत्युत्तर नहीं लिखें । बार्डर लाईन के बाहर लिखे गये उत्तर को परीक्षक द्वारा जाँचा नहीं जायेगा ।

(G)   If there is any sort of ambiguity/mistake either of printing or factual nature then out of Hindi and English version of the question, the English version will be treated as standard.

यदि किसी प्रश्न में किसी प्रकार की कोई मुद्रण या तथ्यात्मक प्रकार की त्रुटि हो तो प्रश्न के हिन्दी तथा अंग्रेजी रूपान्तरों में से अंग्रेजी रूपान्तर मान्य होगा ।

(H)   It should be ensured that the Question-Answer Booklet is provided in a sealed envelope to the candidate.

अभ्यर्थी यह सुनिश्चित कर लें कि अभ्यर्थी को प्रश्नोत्तर पुस्तिका सीलबंद लिफाफे में प्रदान की गई है ।

(I)   Candidate should fill up all desired details on this attached OMR sheet of Question-Answer Booklet with **blue** ball point pen. Please ensure that this OMR Sheet is not torn or damaged.

अभ्यर्थी प्रश्नोत्तर पुस्तिका के ऊपर संलग्न इस ओ.एम.आर. पत्रक पर सभी वांछित विवरण **नीले** बॉल पेन से सावधानीपूर्वक भरें । ध्यान रखें कि यह ओ.एम.आर. पत्रक कहीं से कटे-फटे नहीं अथवा किसी भी प्रकार से क्षतिग्रस्त नहीं हो ।

(J)   This **OMR** Sheet consists of **Two** parts, in which some information is pre-printed; remaining details have to be filled by the candidate.

यह ओ.एम.आर. पत्रक **दो** भागों में बंटा है, जिसमें कतिपय सूचनाएँ पूर्वमुद्रित हैं । शेष की पूर्ति अभ्यर्थी को करनी है ।

(K)   If the Question-Answer Booklet is torn or not printed properly, bring it to notice of invigilator and change the Question-Answer booklet, otherwise the candidate will be liable for that.

यदि प्रश्नोत्तर पुस्तिका कहीं से कटी-फटी या अमुद्रित है, तो अभिजागर के ध्यान में ला दें तथा उसे बदलवा लें, अन्यथा उसका दायित्व अभ्यर्थी का होगा ।

विशेष नोट :

अभ्यर्थी द्वारा यदि ओ.एम.आर. पत्रक पर गलत सूचना भरी जाती है या उसे किसी प्रकार की क्षति पहुँचाई जाती है अथवा उस पर किसी प्रकार का पहचान चिन्ह अंकित किया जाता है, तो आयोग द्वारा संपूर्ण परीक्षा हेतु अभ्यर्थिता निरस्त की जा सकेगी और उसके लिए अभ्यर्थी उत्तरदायी होगा ।
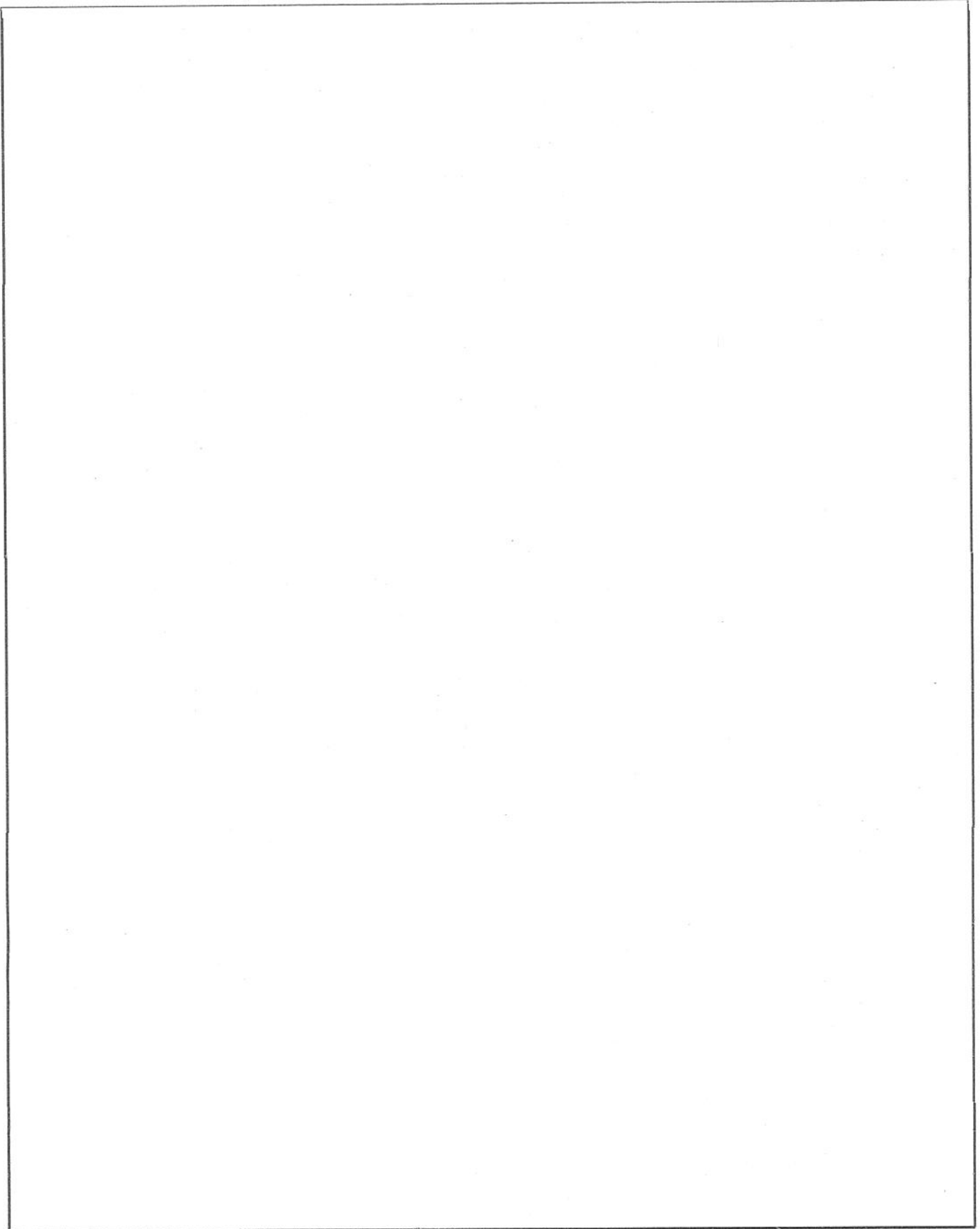
Special Notes :

If there is any wrong information filled by the candidate or any attempt is made to damage it or any marking as identification is done, then his candidature for the entire examination shall be rejected by the commission, for which he will be liable.
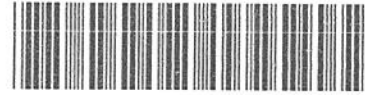
SPACE FOR ROUGH WORK

Paper – II
ELECTRICAL ENGINEERING – II

(Total 200 Marks)
(Total 37 Question)

PART – A

Note :   Attempt **all** questions. Answer the following questions in **15** words each. Each question carries **2** marks.

1.   If spring of PMMC instrument get damaged, what will be the position of pointer ?

2.   How many bits will a D/A converter use so that its full scale output voltage is 5 V and its resolution is at the most 10 mV ?

3.   A digital frequency counter, which has a 3-digit display, gated period of 10 ms is selected to measure an unknown frequency. The reading is 45. What is the frequency of the system ?

4.   What are the factors that decide the configuration of a data acquisition system ?

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5.   An analog indicating instrument with a scale range of 0-5 V shows a voltage of 2.65 V. The true value of a voltage is 2.70 V. What are the values of absolute error, correction and full scale deflection ?

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6.   Explain voltage regulation.

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7.   Write down uses of Schottky diode.

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8.   What do you mean by slew rate of operational amplifier ?

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9.   What is the output voltage of the circuit shown in the figure ?

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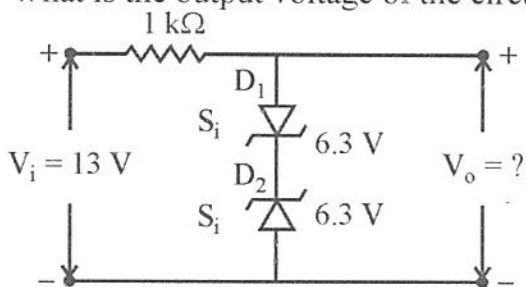
10.   An AM transmitter of 1 kW power is fully modulated. Calculate the power transmitted, if it is transmitted as SSB.

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11.   What are the basic concepts and features of multi-level converters ?

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12. State how high $\frac{di}{dt}$ and $\frac{dv}{dt}$ protection for thyristor circuit are provided ?

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13. What is meant by commutation of SCR ?

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14. What is a current source inverter ?

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15. Explain LDAX instruction for microprocessor.

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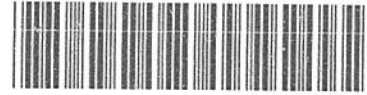
16. Find the memory requirement of the 8085 A microprocessor program.

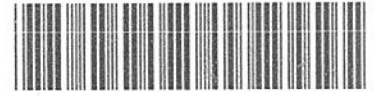   LX1 B, 2475 H

     LX1 D, 3794 H

     LDAX B

     MOV L, A

     LDAX D

     STAX B

     MOV A, L

     STAX D

17. Describe the basic operations performed by the microprocessor.

18. The response of a second order control system has an overshoot of 30% with damping ratio 0.36 for a step input and the overshoot takes place at 0.05 s after application of the input. Find the value of undamped natural frequency.

19. Describe the number of forward and feedback path with their associated gain in given signal flow diagram.
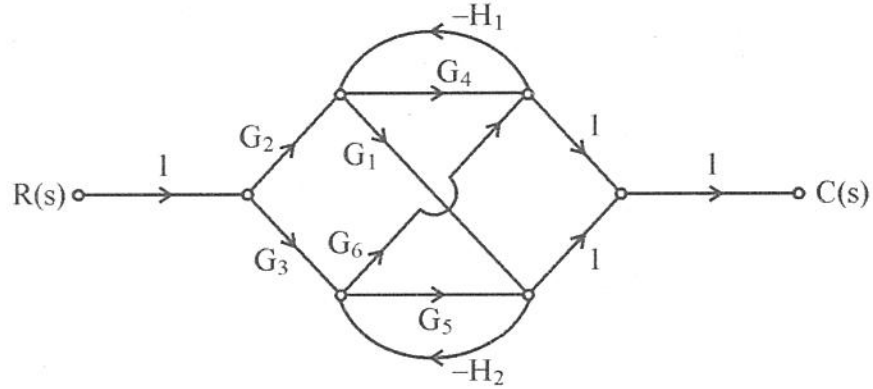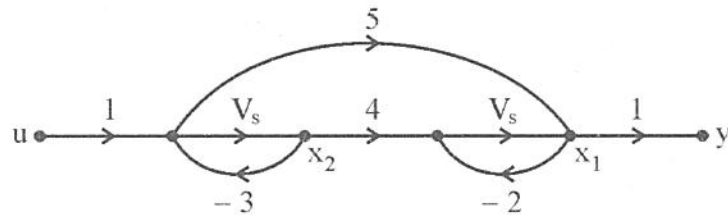

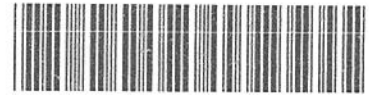20. From the given figure, write down state equations in standard form.

PART – B

Note : Answer **all** the following questions in **50** words each. Each question carries **5** marks.

21. Explain briefly the principle of thermistor and thermocouple.

22. Write down steps for measuring pressure using LVDT.

23. Draw and explain the working of dual slope integrating type digital voltmeter.

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24. A diode whose internal resistance is 20 Ω is supplying power to a 1000 Ω load from a 230 V (rms) source of supply.

Calculate :

(i) The DC diode voltage

(ii) The percentage regulation from no load to given load

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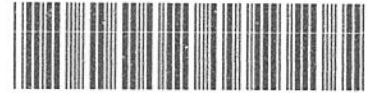
25. Assuming the Op-Amp to be ideal, derive V_o/V_s for the circuit shown below.

26. Calculate electron and hole concentration for an extrinsic silicon sample having minimum conductivity. Given that $\mu_n = 1350$ cm^2/V-S, $\mu_p = 450$ cm^2/V-S and the intrinsic carrier concentration $n_i = 1.5 \times 10^{10}$ cm^{-3}.

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27. Describe different turn-on methods for SCR in circuit.

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28. Explain in brief the classification of chopper circuit.

29. For 8085 microprocessor, what should generally be the first instruction for an assembly language program containing CALL instruction ? What is its significance ?

30. What do you mean by interrupt ? Describe the type and their effect on microprocessor.

31. Consider a feedback system with characteristic equation

$$1 + \frac{k}{s(s+1)(s+2)} = 0$$

Compute the angle of the asymptotes of the root locus branches with the real axis of the S-plane. Also, find the centroid and the breakaway points of the root-locus of the system. Assume that 'k' varies from '0' to '∞'.

32. Determine the open loop transfer function, G(s) H(s) of a feedback control system, whose bode-magnitude plot characteristic is shown in the figure.

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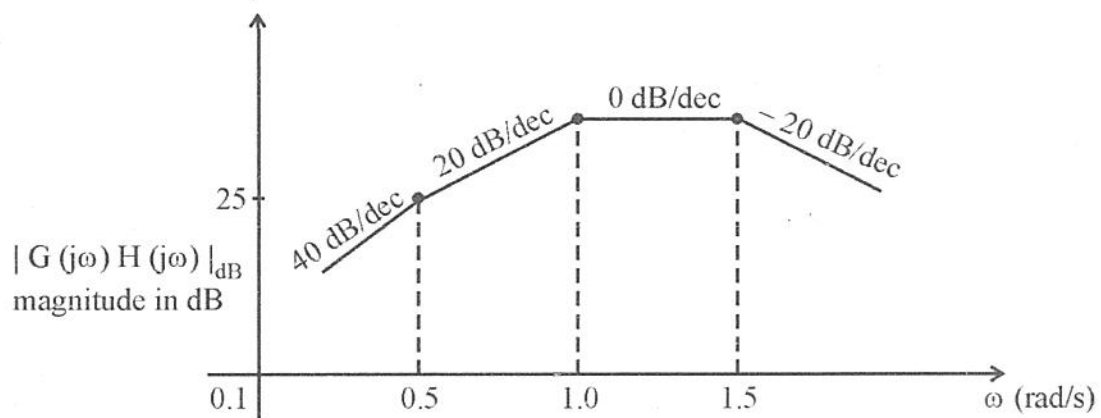
PART – C

Note : Answer the following questions in **100** words each. Each question carries **20** marks.

33. Find the value of R′ in the circuit of figure. For generating sinusoidal oscillations. Find the frequency of oscillations.
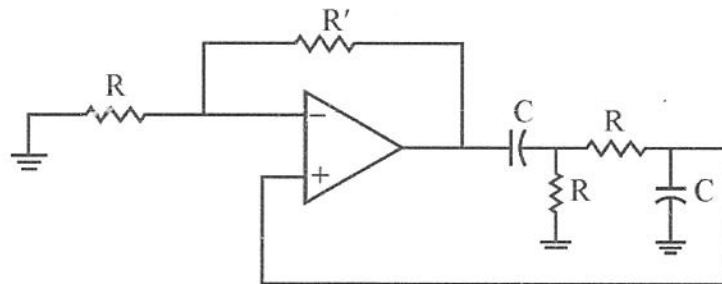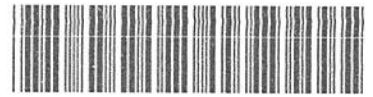
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34. The program given below in run on an 8085 micropocessor system. Determine the contents of the registers : PC, SP, B, C, H, L after a halt instruction is executed :

        LOC
        2000   START LX1 SP, 1000 H
                    LX1 H, 2F37H
                    XRA A
                    MOV A, H
                    INX H
                    PUSH H
                    CZ 20FFH
                    JUMP 3000 H
                    HLT

20FF	ADD H
	RZ
	POP B
	PUSH B
	RM
3000	HLT

35. Describe Anderson's bridge for measuring low inductance. What are its advantages over Maxwell's bridge used for the same purpose ?

36. The state variable representation of a system is given as

$$\dot{x} = \begin{bmatrix} 0 & 1 \\ 0 & -1 \end{bmatrix} x, \quad x(0) = \begin{bmatrix} 1 \\ 0 \end{bmatrix} \text{ and } y = \begin{bmatrix} 0 & 1 \end{bmatrix} \cdot x$$

Obtain the response y(t).

37. What is Piezo-electric transducer ? Derive the expression of output voltage in the measurement of pressure using piezo-electric crystal.

SPACE FOR ROUGH WORK

31

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

34

SPACE FOR ROUGH WORK