# Signature and Name of Invigilator

1.	(Signature)
	(Name)
2.	(Signature)

Roll No.							
	(In f	igure	s as p	er a	dmiss	sion c	ard)
Roll No.							
		(Ir	ı wor	ds)			

Test Booklet No.

D-8805

(Name).

PAPER-III

Time: 2½ hours] ELECTRONIC SCIENCE [Maximum Marks: 200

Number of Pages in this Booklet: 32

### Number of Questions in this Booklet: 26

### Instructions for the Candidates

- 1. Write your roll number in the space provided on the top of this page.
- 2. Answers to short answer/essay type questions are to be given in the space provided below each question or after the questions in the Test Booklet itself.

### No Additional Sheets are to be used.

- 3. At the commencement of examination, the question booklet will be given to you. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as below:
  - (i) To have access to the Test Booklet, tear off the paper seal on the edge of this cover page. Do not accept a booklet without sticker-seal and do not accept an open booklet.
  - (ii) Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Faulty booklets due to pages/questions missing or duplicate or not in serial order or any other discrepancy should be got replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the question booklet will be replaced nor any extra time will be given.
- 4. Read instructions given inside carefully.
- 5. One page is attached for Rough Work at the end of the booklet before the Evaluation Sheet.
- 6. If you write your name or put any mark on any part of the Answer Sheet, except for the space allotted for the relevant entries, which may disclose your identity, you will render yourself liable to disqualification.
- You have to return the Test booklet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the Examination Hall.
- 8. Use only Blue/Black Ball point pen.
- 9. Use of any calculator or log table etc. is prohibited.
- 10. There is NO negative marking.

## परीक्षार्थियों के लिए निर्देश

- 1. पहले पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए।
- 2. लघु प्रश्न तथा निबंध प्रकार के प्रश्नों के उत्तर, प्रत्येक प्रश्न के नीचे या प्रश्नों के बाद में दिये हुये रिक्त स्थान पर ही लिखिये।

## इसके लिए कोई अतिरिक्त कागज का उपयोग नहीं करना है।

- परीक्षा प्रारम्भ होने पर, प्रश्न-पुस्तिका आपको दे दी जायेगी। पहले पाँच मिनट आपको प्रश्न-पुस्तिका खोलने तथा उसकी निम्नलिखित जाँच के लिए दिये जायेंगे जिसकी जाँच आपको अवश्य करनी है:
  - (i) प्रश्न-पुस्तिका खोलने के लिए उसके कवर पेज पर लगी सील को फाड़ लें। खुली हुई या बिना स्टीकर-सील की पुस्तिका स्वीकार न करें।
  - (ii) कवर पृष्ठ पर छपे निर्देशानुसार प्रश्न-पुस्तिका के पृष्ठ तथा प्रश्नों की संख्या को अच्छी तरह चैक कर लें कि ये पूरे हैं। दोषपूर्ण पुस्तिका जिनमें पृष्ठ / प्रश्न कम हों या दुबारा आ गये हों या सीरियल में न हों अर्थात किसी भी प्रकार की त्रुटिपूर्ण पुस्तिका स्वीकार न करें तथा उसी समय उसे लौटाकर उसके स्थान पर दूसरी सही प्रश्न-पुस्तिका ले ले। इसके लिए आपको पाँच मिनट दिये जायेंगे। उसके बाद न तो आपकी प्रश्न-पुस्तिका वापस ली जायेगी और न ही आपको अतिरिक्त समय दिया जायेगा।
- 4. अन्दर दिये गये निर्देशों को ध्यानपूर्वक पढें।
- उत्तर-पुस्तिका के अन्त में कच्चा काम (Rough Work) करने के लिए मूल्यांकन शीट से पहले एक पृष्ठ दिया हुआ है।
- 6. यदि आप उत्तर-पुस्तिका पर अपना नाम या ऐसा कोई भी निशान जिससे आपकी पहचान हो सके, किसी भी भाग पर दर्शाते या अंकित करते हैं तो परीक्षा के लिये अयोग्य घोषित कर दिये जायेंगे।
- 7. आपको परीक्षा समाप्त होने पर उत्तर-पुस्तिका निरीक्षक महोदय को लौटाना आवश्यक है और इसे परीक्षा समाप्ति के बाद अपने साथ परीक्षा भवन से बाहर न लेकर जायें।
- 8. केवल नीले / काले बाल प्वाईंट पैन का ही इस्तेमाल करें।
- 9. किसी भी प्रकार का संगणक (कैलकुलेटर) या लाग टेबल आदि का प्रयोग वर्जित है।
- 10. गलत उत्तर के लिए अंक नहीं काटे जायेंगे।

# **ELECTRONIC SCIENCE**

PAPER – III

NOTE: This paper is of two hundred (200) marks containing four (4) sections. Candidates are required to attempt the questions contained in these sections according to the detailed instructions given therein.

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### **SECTION - I**

Note:	This section contains five (5) questions based on the following
	paragraph. Each question should be answered in about thirty (30)

words and each carries five (5) marks.

(5x5=25 marks)

In a PLL circuit the VCO natural frequency is 150 kHz, the input frequency is 160 kHz, the phase comparator transfer function is 0.2 V/rad., the low pass filter gain is equal to 1, the amplifier gain is equal to 4 and the voltage controlled oscillator gain is 15 kHz/volt.

1. Calculate the PLL open loop gain.

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2.	Calculate PLL output voltage and change in VCO frequency necessary to achieve lock.
	-
	$G_{i}N$
3.	Calculate the phase detector output voltage.
·	carculate the phase detector surpar voltage.

4.	Calculate the hold-in range.
5.	Calculate the static phase error and draw the PLL block diagram.
	<u>, O</u>

P.T.O.

### **SECTION - II**

**Note:** This section contains fifteen (15) questions each to be answered in about thirty (30) words. Each question carries five (5) marks.

(5x15=75 marks)



**6.** What is the difference between avalanche and zener breakdown?

8. State and prove the Superposition theorem.	7.	Compare the performance of JFET and MOSFET.
8. State and prove the Superposition theorem.		
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9.	Using De Morgan's Law show how to implement an OR gate using AND and NOT gate.
	(A)
	$G_{i}N$
10	Describe the configuration of Cabucita triangles are according to the city
10.	Describe the application of Schmitt trigger as a squaring circuit.
	1 A
	· /

11.	How many types of memories are available? Distinguish between static and dynamic memories.
	- M
	W.
	4,1
12.	List out the various steps involved in Object Oriented Programming.
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13.	Explain the operation of a Gunn Diode and mention any two modes of operation.
	- M
	- M.
	, 4, 1
14.	Explain the basic principle of single stub matching.
	$ (\lambda k)^{\alpha}$

15.	Define amplitude, frequency and phase modulation.
	· · · · · · · · · · · · · · · · · · ·
	4,1
16.	Draw the block diagram for generating and detecting PSK signals.

P.T.O.

19	• What is piezoelectric effect? Name two materials that exhibit piezoelectric effect and their applications.
	W.
20	. State Routh-Hurwitz criterion and explain its significance.

P.T.O.

### **SECTION - III**

**Note:** This section contains five (5) questions. Each question carries twelve (12) marks and is to be answered in about two hundred (200) words.

(12x5=60 marks)

- **21.** Design a bistable multivibrator circuit using IC 555. Depict its input and output waveforms for various input settings.
- **22.** (a) Describe the architecture of 8086 microprocessor.
  - (b) Verify the following equation by using Boolean algebra :

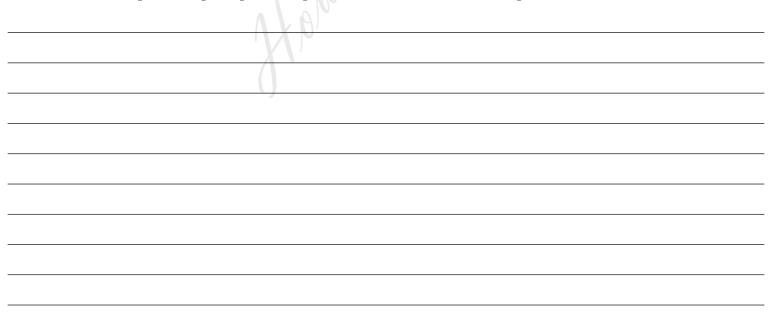
$$AB + AC + B\overline{C} = AC + B\overline{C}$$

- **23.** (a) Write Maxwell's equations in differential and integral forms. Derive the wave equation.
  - (b) In a rectangular waveguide for which a=1.5 cm, b=0.8 cm,  $\sigma$ =0,  $\mu$ = $\mu_0$  and  $\epsilon$ =4 $\epsilon_0$ .

$$H_x = 2 \sin\left(\frac{\pi x}{a}\right) \cos\left(\frac{3 \pi y}{b}\right) \sin\left(\pi \times 10^{11} \text{ t} - \beta z\right) A_m$$

Determine (i) the mode of operation, (ii) the cut-off frequency, (iii) the phase constant  $\beta$ .

- **24.** (a) Describe the dispersion and attenuation characteristics of typical silica optical fibers.
  - (b) Explain the functioning of a PIN photodiode. Define responsivity, quantum efficiency and noise equivalent power of a photo diode.
- 25. Explain the principle and operation of an electron microscope.



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# **SECTION - IV**

Note:		e:	This section consists of one essay type question of forty (40) marks to be answered in about one thousand (1000) words on any of the following topics						
			following topics. (40x1=40 marks)						
<b>26.</b> (a)			Explain the functioning of :						
		( )	(i) monostable						
			(ii) bistable and						
			(iii) astable multivibrator.						
			Discuss the output waveforms.						
			OR						
		(b)	Discuss the Modulation and Demodulation of PM, PCM, ASK and FSK systems.						
		( )							
			<u> </u>						

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Marks Obtained										
Question Number	Marks Obtained	Question Number	Marks Obtained	Question Number	Marks Obtained	Question Number	Marks Obtained			
1		26		51		76				
2		27		52		77				
3		28		53		78				
4		29		54		79	6			
5		30		55		80				
6		31		56		81				
7		32		57		82				
8		33		58		83				
9		34		59		84				
10		35		60	M	85				
11		36		61		86				
12		37		62		87				
13		38		63		88				
14		39		64		89				
15		40		65		90				
16		41		66		91				
17		42		67		92				
18		43	V	68		93				
19		44	72	69		94				
20		45		70		95				
21		46		71		96				
22		47		72		97				
23		48		73		98				
24	V	49		74		99				
25		50		75		100				

Total Marks Obtained	(in words)					
	(in figures)					
Signature & Name of the Coordinator						
(Evaluation)	Date					

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