

Signature and Name of Invigilator

Roll No.

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(In figures as per admission card)

1. (Signature) _____
(Name) _____

2. (Signature) _____
(Name) _____

Roll No. _____
(In words)

Test Booklet No.

J-8808

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

- Write your roll number in the space provided on the top of this page.
- 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.
- 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 :
 - 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.
 - 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.**
- Read instructions given inside carefully.
- One page is attached for Rough Work at the end of the booklet before the Evaluation Sheet.
- 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.
- Use only Blue/Black Ball point pen.
- Use of any calculator or log table etc. is prohibited.
- There is NO negative marking.

परीक्षार्थियों के लिए निर्देश

- पहले पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए।
- 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 :
 - 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।
 - 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 अर्थात् किसी भी प्रकार की त्रुटिपूर्ण पुस्तिका स्वीकार न करें तथा उसी समय उसे लौटाकर उसके स्थान पर दूसरी सही प्रश्न-पुस्तिका ले लें। 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।
- अन्दर दिये गये निर्देशों को ध्यानपूर्वक पढ़ें।
- उत्तर-पुस्तिका के अन्त में कच्चा काम (Rough Work) करने के लिए मूल्यांकन शीट से पहले एक पृष्ठ दिया हुआ है।
- 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।
- 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।
- केवल नीले / काले बाल प्वाइंट पेन का ही इस्तेमाल करें।
- किसी भी प्रकार का संगणक (कैलकुलेटर) या लाग टेबल आदि का प्रयोग वर्जित है।
- 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.

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)

Even in a large scale digital system, such as a computer or a data-processing, control or digital-communication system, there are only a few basic operations which must be performed. These operations to be sure, may be repeated very many times. The four circuits most commonly employed in such a systems are known as the OR, AND, NOT, NOR etc. These are called logic gates or circuits, because they are used to implement Boolean algebraic equations. This algebra was invented by G. Boole in the middle of the nineteenth century as a system for the mathematical analysis of logic.

1. Define :

- (a) Positive logic
- (b) Negative logic

2. Define an OR gate and give its truth table.

3. Define an AND gate and give its truth table.

4. State the two forms of De Morgan's Law.

5. Show how to implement an AND with OR and NOT gates.

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. Define the followings :

- (a) Cut-in voltage of a transistor.
- (b) Early effect

7. Describe the physical mechanism of Zener breakdown. Draw a circuit which uses Zener diode to regulate the voltage across a load.

8. State clearly the Thevenin's and Superposition theorems and explain their usefulness in linear network analysis.

9. What do you mean by Multivibrator ? Classify different types of multivibrator. Explain the operation of bistable multivibrator.

10. What is Memory ? Describe different memory types used with microprocessor based system.

11. What is conditional operator in C ? When it can be used ? What do you mean by storage class in C ?

12. Define the characteristic impedance of a transmission line. When is the input impedance of a transmission line equal to its characteristic impedance ? Explain the meaning of the term 'Standing Wave Ratio'.

13. What is Multiplexing ? Discuss Time Division Multiplexing.

14. Explain critical angle, acceptance angle and numerical aperture for an optical fiber.

15. Write short notes on Logic State Analyser.

16. Describe the diffusion process. What do you mean by impurity profile ?

17. What is signal generator ? How does it differs from an ordinary oscillator ?

18. Explain in detail the principle of operation and working of any A/D converter with the help of necessary diagram.

19. What do you understand by interrupt in 8085 microprocessor system ? Explain different steps to understand the execution of interrupt instructions.

20. Compare the laser diode and LED for use as light sources in optical communication system.

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.** (a) Describe the various steps involve in photoetching process during IC fabrication.
(b) State and prove Norton’s theorem.

- 22.** (a) Classify different types of oscillators.
(b) State and prove Barkhausen’s criterion for oscillator.

- 23.** Explain the architecture of 8086 microprocessor.

- 24.** Draw the block diagram of a PLL system and explain its ability to track the frequency changes in the input signal. What do you mean by “Lock range” and “Capture range”.

- 25.** Explain the difference between open loop and closed loop control system.

Lined writing area with multiple horizontal lines for text entry.

SECTION - IV

Note : 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.

(40x1=40 Marks)

- 26.** (a) Draw the circuit of an OPAMP as an integrator and explain its operation.
(b) Draw the structure and refractive index profile for
(i) step-index multidiode
(ii) graded-index and
(iii) single mode fibers
(c) Define the term flag and explain how each flag are executed with suitable examples.
(d) With a neat circuit diagram, explain the working of a crystal oscillator. Give its merits and demerits.

OR

- (a) Explain in detail the principle and working of D/A converter.
(b) A program has been compiled and linked successfully. When you run this program you face one or more of the following situations.
(i) Program is executed but no output
(ii) It produces incorrect answers
(iii) It does not stop running
What are the possible causes in each case and what steps would you take to correct them ?
(c) With a neat diagram, explain the working of cavity magnetron.
(d) Discuss 'Hall Effect' in materials. Explain how this phenomena can be used to determine whether a semiconductor is 'n' type or 'p' type.

FOR OFFICE USE ONLY							
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	
5		30		55		80	
6		31		56		81	
7		32		57		82	
8		33		58		83	
9		34		59		84	
10		35		60		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		68		93	
19		44		69		94	
20		45		70		95	
21		46		71		96	
22		47		72		97	
23		48		73		98	
24		49		74		99	
25		50		75		100	

Total Marks Obtained (in words)

(in figures)

Signature & Name of the Coordinator

(Evaluation) Date