Signature and Name of Invigilator

1. (Signature) _____

   (Name) _____

2. (Signature) _____

   (Name) _____

Roll No. ☐☐☐☐☐☐☐

(In figures as per admission card)

Roll No. _____

(In words)

Test Booklet No.

D–8807

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	परीक्षार्थियों के लिए निर्देश
1. Write your roll number in the space provided on the top of this page.	1. पहले पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए।
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.**	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।**
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 :	3. 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) 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.	(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) **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.**	(ii) **कवर पृष्ठ पर छपे निर्देशानुसार प्रश्न-पुस्तिका के पृष्ठ तथा प्रश्नों की संख्या को अच्छी तरह चेक 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 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।**
4. Read instructions given inside carefully.	4. अन्दर दिये गये निर्देशों को ध्यानपूर्वक पढ़ें।
5. One page is attached for Rough Work at the end of the booklet before the Evaluation Sheet.	5. उत्तर-पुस्तिका के अन्त में कच्चा काम (Rough Work) करने के लिए मूल्यांकन शीट से पहले एक पृष्ठ दिया हुआ है।
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.	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. 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.	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. **Use only Blue/Black Ball point pen.**	8. केवल नीले/काले बाल प्वाईंट पैन का ही इस्तेमाल करें।
9. **Use of any calculator or log table etc. is prohibited.**	9. किसी भी प्रकार का संगणक (कैलकुलेटर) या लाग टेबल आदि का प्रयोग वर्जित है।
10. **There is NO negative marking.**	10. गलत उत्तर के लिए अंक नहीं काटे जायेंगे।

D–8807   **1**   **P.T.O.**

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)

Integrated circuits are classified as either linear or digital, referring to the two broad categories of applications for which they may be designed. Linear integrated circuits are those whose components are operated in the linear or active regions of their characteristics such as amplifiers. These circuits are said to be analog or continuous in nature, because voltages and currents can vary through a continuous range of possible values. Applications include audio and high-frequency amplifiers, operational amplifiers, modulators, oscillators, voltage regulators and power amplifiers. Digital integrated circuits are those whose components are used in logic and switching circuits. The devices in digital ICs are operated so that they switch rapidly between only two possible outputs, typically saturation and cut-off. They are used in computer logic circuitry, computer memories, and digital communication systems.

1. List out different steps for fabrication of integrated circuits.

_____

_____

_____

_____

_____

_____

_____

_____

2. Mention characteristics of analog ICs.

3. Explain the operating principle of any LSI digital IC logic family.

D — 8807

4

4. Define propagation delay and fan-out of digital logic system.

_____

_____

_____

_____

_____

_____

_____

_____

_____

5. Define the characteristics of ideal operational amplifier.

_____

_____

_____

_____

_____

_____

_____

_____

_____

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.   Draw the bridge rectifier circuit and define the term "ripple factor".

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

D — 8807   **6**

7. Describe the process of epitaxial growth.

_____

_____

_____

_____

_____

_____

_____

_____

_____

8. What are the advantages and disadvantages of frequency response analysis ?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

9. State and prove the Superposition theorem.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

10. Discuss the superiority of FETs over BJTs.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

D — 8807   8

11. Discuss the advantage of object oriented programming in C.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

12. Draw the equivalent circuit and explain the working principle of SCR.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

13. What is meant by interrupt ? What are its types with respect to 8085 microprocessor.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

14. What are the advantages of PPM over PAM ?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

D — 8807 10

15. Explain the function of Gunn diode.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

16. With the help of schematic diagram, describe the working principle of Magnetron.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

D — 8807 11 **P.T.O.**

17. Define directivity and effective area of an antenna. Draw the radiation pattern of a half-wave dipole antenna.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

18. In what way is the graded-index fiber better than the multimode step-index fiber ? Define the normalized frequency for an optical fiber and explain its use in the determination of number of guided modes propagating within a step-index fiber.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

D — 8807   **12**

19. Draw the circuit diagram using OPAMP as an integrator.

20. Discuss open-loop and close-loop control system.

D — 8807   **13**   **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. Explain pinch-off effect for JFET. Write an equation relating V_{GS} to V_P for a JFET.

22. What do you mean by Phase Lock Loop (PLL) ? Explain free running frequency, capture range and locking range.

23. (a) Use an op-amp to be connected as
    (i) Differentiating circuit
    (ii) Summer
    (b) Define the following :
    (i) CMRR
    (ii) Bandwidth
    (iii) Open-Loop and closed loop gain of op-amp

24. Describe the step by step procedure to draw Bode plot ?

25. What do you mean by spontaneous emission and stimulated emission ? Why LASER shows high degree of coherence ?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

D—8807   14

20

D — 8807   **22**

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) Explain zener diode and draw its I - V characteristics.

(b) Draw the necessary diagram and explain the functioning of Maximum Power Transfer theorem.

(c) Explain in detail the working of band pass filter.

(d) What do you mean by multivibrator ? With a neat diagram, explain the operation principle of bistable multivibrator.

OR

(a) Explain the principle of PIN photodiode and how it is used as an optical detector in fiber optic communication.

(b) With a neat diagram, explain the operation of C.R.O. Give three applications.

(c) Draw the architecture of 8085 microprocessor and explain its working.

(d) Discuss the operation of PID controller.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

D — 8807 24

D — 8807   28

29

D — 8807   **30**

31

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 ....