

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.

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".

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.

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 ?

15. Explain the function of Gunn diode.

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

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.

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

20. Discuss open-loop and close-loop control 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.
(12×5=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 ?

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 PIO controller.

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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	
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