

19. (a) Explain the working of a T flip-flop and give the truth table.

Or

- (b) What are shift registers? Discuss their working in detail.
20. (a) Explain the concept of multiplexer.

Or

- (b) Differentiate between asynchronous and synchronous counters.

PART C — ($3 \times 10 = 30$)

Answer any THREE questions.

21. Explain the V-I characteristics of tunnel diode. Draw construct its working of Tunnel diode.
22. Define an oscillator, with circuit explain the working of a wein's bridge oscillator.
23. Draw the circuit of a monostable multivibrator using 555 timer and explain its working.
24. What is racing in JK flip-flop? How it is solved in JK master - slave flip-flop?
25. Show how a 4-bit binary counter is converted to a BCD counter?

S.No. 3246

P 22 PYCC 1 A

(For candidates admitted from 2022-2023 onwards)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2022.

Physics — Core Choice Course

ANALOG AND DIGITAL ELECTRONICS

Time : Three hours

Maximum : 75 marks

PART A — (20 marks)

Answer ALL questions.

- I. Multiple choice questions : ($5 \times 1 = 5$)
1. A semiconductor is formed by _____ bonds.
(a) Covalent (b) Electrovalent
(c) Co-ordinate (d) All of the above
2. Op-Amp performs which type of mathematical type operations.
(a) Linear (b) Non-linear
(c) Frequency (d) All of above
3. The output voltage of phase detector is
(a) Phase voltage
(b) Free running voltage
(c) Error voltage
(d) All of the above

4. Which characteristics of IC in digital circuits represents a function of the switching time of a particular transistor?
- (a) Fan-out (b) Fan-in
(c) Propagation delay (d) Power dissipation

5. Which number system has a base 16?
- (a) Hexadecimal (b) Octal
(c) Binary (d) Decimal

II. Fill in the blanks : (5 × 1 = 5)

6. How many methods of contouring are present?
7. Digital system are called _____.
8. The output of the sequential circuit depends upon _____.
9. Op-Amp is a _____ type of amplifier.
10. An electron and a hole in close proximity would tend to _____.

III. Answer the following questions : (5 × 2 = 10)

11. Define capacitors.
12. What is meant by oscillator?

13. What are the advantages of Frequency Shift Keying (FSK)?
14. What is meant by flip-flops?
15. Define ring counters.

PART B — (5 × 5 = 25)

Answer ALL questions, choosing either (a) or (b).

16. (a) Construct the operations of the DIAC and its V.I characteristics.

Or

- (b) How to fabricate monolithic resistors and diodes?

17. (a) Explain the various types of waveforms?

Or

- (b) With a block diagram, explain the principle and working of D/A counters (binary weighted)?

18. (a) Explain the working of 555 timer connected as schmitt trigger.

Or

- (b) Explain the circuit of Analog phase detector.