Reg. No ..... Name **20P3032**

M. Sc DEGREE END SEMESTER EXAMINATION - OCT/NOV 2020: JAN 2021

SEMESTER 3 : PHYSICS

COURSE : **16P3PHYT11EL : MICROELECTRONICS AND SEMICONDUCTOR DEVICES**

(For Regular - 2019 Admission and Supplementary - 2016/2017/2018 Admissions)

Time : Three Hours Max. Marks: 75

PART A

Answer any 5 (1 marks each)

1. In 8085 microprocessor ------flag is affected while executing JNZ Instruction.
   (a) Carry (b) Overflow (c) Zero (d) parity
2. With 12 lines, the number of memory locations that can be created in 8085 microprocessor
   (a) 32 kb (b) 64 kb (c) 16 kb (d) 4 kb
3. $1/C^2$ as a function of Vr (C - capacitance, Vr - reverse voltage) plot of a Schottky diode will be
   (a) linear (b) parabolic (c) both and b (d) none of these
4. The intel 8086 microprocessor is a _____ processor
   (a) 8 bit (b) 16 bit (c) 32 bit (d) 4 bit
5. The 8051 microcontroller CPU is ..... bit
   (a) 4 (b) 8 (c) 16 (d) 32

(1 x 5 = 5)

PART B

Answer any 7 (2 marks each)

6. Draw the memory organization of a computer system employing a cache memory
7. Compare SRAM and DRAM
8. Write note on cache memory.
9. What is a heterojunction? Comment about the barrier height in the case of a heterojunction.
10. Give the energy band diagram of a tunneling barrier.
11. Give the energy band diagram of a reverse biased Schottky diode.
12. Indicate the data types that can be handled by 8086
13. Discuss the two pins a) DT/$\overline{R}$ and b) $\overline{DEN}$
14. What are the various flow chart elements.
15. What are microcontrollers?

(2 x 7 = 14)

PART C

Answer any 4 (5 marks each)

16. Draw the timing diagram of 8085 memory read cycle.
17. Calculate the theoretical barrier height, built in potential barrier and maximum electric field in a tungsten to n-type silicon Schottky diode at T=300 K and doping concentration of Nd = 3 $\times$ $10^{16}/cm^3$ (ϕ_m= 4.55 V, X = 4.01 V, Nc = 2.8 x 10^{19} $/cm^3$).
18. Obtain an expression for the distance of barrier peak (x_m) from metallurgical junction of a Schottky diode where image force induced lowering is to be considered.
19. Discuss about the flag registers of 8086 microprocessor with block diagram
20. Explain the instruction set of 8086 microprocessor.
21. OR the contents of ports 1 and 2 and put the the result in external RAM location 0100H.

(5 x 4 = 20)

PART D

Answer any 3 (12 marks each)

22.1. Discuss about the instruction set of 8085 microprocessor

OR

2. With a schematic diagram explain how an 8 bit microprocessor can be interfaced to 6k RAM (six 1k×8 bit) using linear select decoding technique.

23.1. What are the qualitative characteristics and ideal junction properties of Schottky junction diode?

OR

2. Discuss the energy band gap of heterojunction materials and the concept of two dimensional electron gas.

24.1. With a neat diagram explain the internal architecture of 8086 microprocessor.

OR

2. With neat internal block schematic, explain the architecture of 8051

(12 x 3 = 36)