19P3032

Reg. No ..... Name .....

M. Sc DEGREE END SEMESTER EXAMINATION - OCTOBER 2019

SEMESTER 3 : PHYSICS

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

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

Time : Three Hours Max. Marks: 75

Section A
Answer all Questions (1 marks each)

1. Physical memory address space of 8085 is
   (a) 32 kb (b) 64 kb (c) 16 kb (d) 8 kb
2. ------ is an arithmetic Instruction.
   (a) Mov d,s (b) CMP a,b (c) IN a,DX (d) POP
3. Heterojunction is formed between .....
   (a) Si:Ge (b) Si:Al (c) both a and b (d) data insufficient.
4. The 16 bit flag of 8086 microprocessor is responsible to indicate
   (a) the condition of result of ALU operation
   (b) the condition of memory
   (c) the result of addition
   (d) the result of subtraction
5. Name the register in 8051 microcontroller that does not have an internal address.
   (a) DPTR (b) PC (c) SP (d) TMOD

(1 x 5 = 5)

Section B
Answer any 7 (2 marks each)

6. State advantages of cache memory
7. Compare SRAM and DRAM
8. Write note on virtual memory and cache memory.
9. Give the energy band diagram of a tunneling barrier.
10. Give the energy band diagram of a non rectifying metal-n semiconductor junction with positive voltage applied to metal.
11. Give the energy band diagram of a reverse biased Schottky diode.
12. What is physical address of 8086 microprocessor?
13. Define OFFSET address of 8086 microprocessor.
14. Differentiate between a microprocessor and a microcontroller.
15. What are microcontrollers?

(2 x 7 = 14)

Section C
Answer any 4 (5 marks each)

16. Explain memory decoding using PAL.
17. 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.
18. Calculate the Schottky barrier lowering and position of the maximum barrier height for gallium arsenide metal semiconductor contact where the electric field in the semiconductor is assumed to be 6.8×10^4 V/cm. (permittivity = 13.1).
19. Explain the advantage of segmented memory in 8086 microprocessor.
20. Give the significance of 'O' flag, 'T' flag, 'I' flag and 'D' flag of 8086 microprocessor.
21. Put the number 34H in registers R5, R6 and R7.

(5 x 4 = 20)

Section D
Answer any 3 (12 marks each)

22.1. Classify and explain the various functional categories of 8085 instruction set.

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. Discuss the two types of metal semiconductor contacts.

OR

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

24.1. Draw the pin diagram of 8086, and explain their functions

OR

2. What are the main features of 8051 microcontroller? Give the pin and block diagrams of 8051.

(12 x 3 = 36)