2020

COMPUTER SCIENCE — HONOURS

Fifth Paper

Full Marks : 100

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer ***question No.* 1** and ***any four*** questions from the remaining, taking ***at least one*** from each Group.

1. Answer ***any five*** questions : 4×5

(a) Give examples of conditional call and conditional return instruction in 8085.

(b) What is USB?

(c) What is the difference between FDM and WDM?

(d) What do you understand by vector interrupts?

(e) Write two functions of physical layer.

(f) What is the difference between RZ and NRZ encoding?

(g) Write the difference between Hardware and Software interrupt in 8085 microprocessor.

(h) Draw the structure of a co-axial cable.

(i) Name the different layers of TCP/IP protocol.

(j) What is quantization?

(k) Name different Transmission impairments.

(l) Give two examples of non-maskable interrupts.

(m) State Shanon's theorem.

(n) If the system clock is 6 MHz, then calculate the time required by microprocessor 8085 to execute the instruction MVIA, 08H.

(o) What is the purpose of ALE signal?

Group - A

2. (a) Why is the address bus of 8085 μp used in multiplexed way? What is the purpose of demultiplexing the bus? How can it be done?

(b) Discuss in brief about RST 5.5, RST 6.5 and RST 7.5 interrupts. (2+3+6)+9

3. (a) Draw the timing diagram for the Instruction of LDA 8000, the Opcode of LDA 8000 is 3AH and the code is written across E000H, E001H and E002H memory locations which is shown below :

E000H	3AH	STA 8000
E001H	00H	
E002H	80H	

(b) Draw the basic Architecture of Microprocessor 8085 and explain each block in brief. 10+10

4. (a) Discuss the functions of the following signals of 8085 : IO/$\bar{M}$, INTR, HOLD, ALE and READY.

(b) Construct a Hardware Interrupt circuit to insert the Opcode of RST-6 into Microprocessor 8085. The Opcode of RST-6 is F7, whenever the Microprocessor 8085 is interrupted using INTR, the Opcode of RST-6 (F7H) would be inserted via the hadware circuit into the Data Bus of Microprocessor 8085. (2×5)+10

Group - B

5. (a) Formulate a hardware procedure for detecting an overflow by comparing the signs of the augend and addend. The numbers are in signed 2's complement representation.

(b) Design a 4-bit combinational circuit decrementer using four full adder circuits. 10+10

6. (a) Multiply -7_{10} with 4_{10} using Booth's multiplication method. Show all the steps of multiplication.

(b) Explain with an example how the address field of an indexed addressing mode instruction can be made similar with the register indirect mode instruction. 10+10

7. (a) Explain the direct mapping technique used in cache memory with proper illustrations.

(b) Draw the basic hardware for 2's complement addition and subtraction and explain it in brief with a suitable example. 10+10

Group - C

8. (a) An analog signal is limited to 4KHz. It is converted to a PCM signal using 8 bit/sample. What is the bit note on the transmission line?

(b) If signal to noise ratio is 7dB and bandwidth is $10KH_Z$, find the capacity of the channel.

(c) Draw the waveforms of (i) ASK (ii) FSK and (iii) PSK for the data 10110110.

(d) State the advantage of delta modulation. 4+4+9+3

9. (a) How is band rate related to transmission bandwidth of FSK and PSK?

(b) Explain : (i) Sampling (ii) Quantization in context to analog to digital conversion. 8+12

10. Write short notes on (***any two***) : 10×2

(i) SMTP

(ii) Video Conferencing

(iii) MAC

(iv) OSI model

(v) Burst mode DMA data transfer.