

2021

**COMPUTER SCIENCE****[HONOURS]****Paper : V**

Full Marks : 100

Time : 4 Hours

*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.***GROUP-A****(Marks : 50)**Answer **Q. No. 1** and any **three** from the rest.1. Answer any **four** questions from the following:

2×4=8

- a) Mention the functions of an Assembler.
- b) What is meant by an addressing mode?
- c) Explain the concept of virtual memory.
- d) What is an opcode? How many bits are needed to specify 32 distinct operations?
- e) What is an interrupt?
- f) Compare RISC with CISC architecture.
- g) What does the term 'Cycle Stealing' mean?

2. a) What is instruction cycle? What are the different phases of instruction cycle?

b)  $M=A+(B-C)*d$ 

Evaluate the above arithmetic expression using one, two and three address instruction.

c) Explain briefly any two addressing modes with suitable examples.  $(2+2)+6+4=14$ 

3. a) Explain direct mapped cache organization in details.

b) What is write back and write through caches?

c) A cache has following specifications:

Block size = 16 words

Set size = 2 way set associative

Word size = 32 bits

Number of sets = 128

Physical address = 23 bits

i) How many blocks main memory contains?

ii) What is the extra memory required for cache?

iii) How many and what size of tag comparator required?

d) Write a short note on memory hierarchy.

 $5+3+4+2=14$ 

4. a) Explain the working principles of magnetic disk.

*[Turn over]*

- b) A two level memory is having 140 nanosecond average access time without the level, 30 nanosecond with level. If the fastest memory access time is 20 nanosecond, what is the hit ratio?
- c) What is Associative memory?  $8+4+2=14$
5. a) Explain Booth's multiplication algorithm with the help of flow chart.
- b) Apply Booth's algorithm to multiply the two decimal numbers 6 and (-4). Assume the multiplicand and multiplier to be of 4 bits each.
- c) Represent the following two's complement values in decimal–  
 $1101011$  and  $0101101$        $7+5+2=14$
6. a) What are functions of an I/O interface?
- b) Explain daisy-chaining process of prioritizing interrupt.
- c) Draw the block diagram of an Asynchronous Communication interface and explain its operation in detail.       $2+5+7=14$

## GROUP-B

(Marks : 50)

Answer **Q. No. 7** and any **three** from the rest.

7. Answer any **four** questions:       $2 \times 4 = 8$
- a) What is the difference between half-duplex and full-duplex transmission modes?
- b) What is attenuation?
- c) Differentiate between analog and digital signal.
- d) What function does a Modem perform?
- e) How do guided media differ from unguided media?
- f) What is a major disadvantage of Asynchronous transmission?
- g) What is the function of OSI session layer?
8. a) Explain in detail, the concept of TCP/IP protocol suite of computer network with a neat diagram.
- b) What is network topology? Explain any two network topologies.
- c) What is the difference between half-duplex and full-duplex transmission modes?

$$8+(2+2)+2=14$$

9. a) What is transmission impairments in data communication networks? Briefly explain different types of transmission impairments.  
b) Discuss about digital data and digital signal.  
c) Explain CRC method in details.

$$(2+4)+3+5=14$$

10. a) Explain about the principle of packet switching. What are the advantages of packet switching compared to circuit switching?  
b) The bit stream 10011101 is transmitted using CRC error-detecting scheme using generator polynomial  $x^3+1$ . What would be received data if no error occurs?  
c) What is piggy backing? (5+2)+5+2=14

11. a) Explain the role of a DNS on a computer network.  
b) What is the function of UDP? What is the difference between FTP and HTTP?  
c) Discuss various HTML Tags used in webpage design. 4+(3+3)+4=14

12. Write short notes on (any **four**):  $3\frac{1}{2}\times 4=14$

- a) Shannon Capacity

- b) DNS  
c) HTTP  
d) Frequency Shift Keying (FSK)  
e) Network Impairments  
f) Delta Modulation