West Bengal State University

B.A./B.Sc./B.Com. (Honours, Major, General) Examinations, 2012

PART–III

COMPUTER SCIENCE — HONOURS

PAPER–V

Duration : 4 Hours] [Maximum Marks : 100

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

The figures in the margin indicate full marks.

Question No. 1 is compulsory and answer any *five* questions taking at least one from each Group.

1. Answer any *ten* questions : $10 \times 2 = 20$

a) What is program status word ? Relate PSW with state of the machine ?

b) State the difference between a maskable and a non-maskable interrupt.

c) Define hit ratio and explain its significance.

d) How is a repeater different from an amplifier ?

e) What is the difference between Bit rate & Baud rate ?

f) How microprocessors evolved from 4004 to 8085 ? Which organisation is credited with this evolution ?

g) What floats in floating point number systems ? Show that it is merely an approximation which increases number range in lieu of precision and it only can be done with the help of fixed point numbers.

h) For which multiplier pattern does Booth's algorithm for integer multiplication give the worst result ? Explain your answer.

i) Which logical operation is commutative but not associative ? Give example.

j) If both HOLD and TRAP inputs of 8085 MPU are activated simultaneously, which one will be serviced first and why ?

k) Differentiate between packet switching and circuit switching.

l) Give an example where gray or cyclic codes are used.

m) Why a separate stack pointer register is necessary at all ?

n) Show that 2 out of 5 code is a non-weighted code with inherent error detection compatibility.

o) What are the main differences between 8085 and 8086 MPU ?

p) Difine 'T' state, 'Machine cycle' and 'Instruction cycle'.

GROUP – A

2. a) What are the basic rules that are followed in instruction set design ?

b) Why are NOP instruction related in an architecture ?

c) How does NOP affect CPU Execution ? 8 + 4 + 4

3. a) Design a gate level circuit for adder/subtractor unit in 2's complement number system.

b) Differentiate between ripple carry adder and carry look ahead adder in the context of hardware complexity. 8 + 8

4. a) What is overflow ?

b) Define truth table and switching function for overflow. 8 + 8

5. a) What is monitor ?

b) Why is monitor needed in any microcomputer system ? 8 + 8

6. a) Distinguish between memory mapped I/O and I/O mapped I/O.

b) What is DMA ?

c) What type of memory is used in pen drive ? 8 + 4 + 4

7. The following is an algorithm for finding number of ones in a bit string :

$C \leftarrow 0$

while $B \neq 0$ do $\begin{cases} C \leftarrow C + 1 \\ B \leftarrow B \cap (B - 1) \end{cases}$

where $B = b_n b_{n-1} \ldots b_2 b_1$ is a bit string.

Write an assembly language program for this algorithm. 16

GROUP – B

8. a) What is a protocol ?

b) Show how protocol helps in Bus arbitration. 6 + 10

9. a) Why are A/D converters at all relevant in Computer Science ?

b) Design an A/D converter using a counter. 6 + 10

10. a) What is a bus ?

b) Why tristate devices are prefered rather than Bipolar devices for bus system.

6 + 10

GROUP – C

11. a) Why and when MODEM is necessary for data communication ?

b) What do you mean by DNS ? What is DNS server ?

c) What is URL ? How does a URL differ from the domain name ?

8 + (2 + 2) + 4

12. a) Connect a multiplexer with a demultiplexer so that parallel I/O is connected to serial and then parallel. Why it is necessary for data communication ?

b) Comment on TCP/IP. 10 + 6