

2017
COMPUTER SCIENCE — GENERAL
First 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 five** from the rest, taking at least **one** from each **Group**

1. Answer **any ten** questions : 2×10
- (a) What is an output device? Name at least two input devices.
- (b) Find the value of $25_{10} - 35_{10}$ using 1's complement and 2's complement method.
- (c) Find the dual of $F = X + YZ'$.
- (d) Express $F = XY + X'Z$ in its canonical form.
- (e) Contrast the features of SRAM and DRAM.
- (f) Distinguish between a compiler and an assembler.
- (g) What is Program Status Word?
- (h) Explain how Cache memory operates.
- (i) What is thrashing?
- (j) What is pipelining?
- (k) Write two features of 3rd generation computer system.
- (l) State and explain De Morgan's Theorem for two variables.
- (m) State the advantages of Spooling.
- (n) Discuss how virtual memory is used.
- (o) How can a file on a computer be accessed?

Group – A
(General Concepts)

2. (a) What is meant by Von Neumann's stored program concept?
 (b) What is 'world wide web'?
 (c) Compare and contrast machine language and assembly language.
 (d) What is 'linker'? 4+4+4+4
3. (a) Discuss the similarities and differences between procedural and object oriented programming languages.
 (b) What are magnetic disks? State its advantages and disadvantages.

[Turn Over]

- (c) What is multimedia system? List out the building blocks of multimedia.
 (d) Write the pseudocode to evaluate the factorial of a number. $4+4+(2+2)+4$

Group – B

(Digital Logic Design)

4. (a) Convert $(FACE)_{16}$ to its corresponding binary code.
 (b) Explain how decoders can be used as demultiplexers.
 (c) Show that multiplexers are functionally complete.
 (d) Design a 3-input adder using two 2 input adders and logic gates of your choice. $3+4+5+4$
5. (a) Design a 3-bit full sequence counter.
 (b) Construct a 4-bit binary shift (bi-directional) register.
 (c) Write down the characteristic expression of J-K flipflop. Show how a J/K Flipflop can be converted into a D flipflop. $5+5+(3+3)$

Group – C

(Computer Architecture and Organization)

6. (a) Compare and contrast RISC and CISC architecture. Differentiate between direct and indirect addressing.
 (b) What are zero-address instructions?
 (c) Explain the actions of the stack pointer during a subroutine call. $(4+3)+3+6$
7. (a) What is auxiliary memory? What is the function of DMA?
 (b) Explain, with suitable example, the fetch and execution cycles of CPU.
 (c) What are the various types of instruction format?
 (d) How can data be erased from EPROM chips? $(3+2)+5+3+3$

Group – D

(Operating System)

8. (a) What is operating system? What are its major functions?
 (b) What is batch processing? State its advantages over serial processing.
 (c) What is round-robin scheduling? Explain. $6+(2+3)+5$
9. (a) Explain what is meant by real-time operating system.
 (b) What is process? Explain the process state diagram.
 (c) Differentiate between internal and external fragmentation. What is a page fault?
 (d) Why is the shell not part of kernel? $4+(2+3)+(3+2)+2$