



WEST BENGAL STATE UNIVERSITY
B.A./B.Sc./B.Com. Major Part-I Examination, 2020

COMPUTER APPLICATION

PAPER-CMAV-I

Time Allotted: 2 Hours

Full Marks: 50

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.*

Answer any three questions from the following

16×3 = 48

1. (a) Prove by induction $6.7n - 2.3n$ is divisible by 4 for all positive integers n . 4
- (b) Out of 440 students in a class, 112 read German, 120 read French, 168 read Spanish, 32 read French and Spanish, 40 read German and Spanish, 20 read German and French, 12 read all three subjects. How many students read just one subject? 5
- (c) Solve the recurrence relation $F_n = 10F_{n-1} - 25F_{n-2}$. Where $F_0 = 3$ and $F_1 = 17$. 5
- (d) What is tautology? 2

2. (a) Illustrate the BFS and DFS algorithms with suitable example. 8
- (b) Prove that the number of nodes in a binary tree of height h is $\leq 2^{h+1} - 1$. 4
- (c) Explain Kruskal's algorithm. 4

3. (a) Write an algorithm to delete the first node of a linked list. 6
- (b) Sort the following list of elements using Quick Sort and explain. 6
10, 85, 36, 90, 45, 55, 73
- (c) What are the limitations and advantages of linear array? 4

4. (a) Draw a full adder using half adder. 5
- (b) Explain 3 to 8 line Decoder. 5
- (c) Implement the circuit of NOR gate and NAND gate using 2:1 MUX. 4
- (d) State De Morgan's theorem. 2

5. (a) What is shift register? 2
(b) Differentiate between synchronous and asynchronous counter. 3
(c) Convert a SR F/F into JK F/F. 5
(d) Draw an excitation table of T F/F. 3
(e) Draw an Ex-OR gate with minimum number of NAND gates. 3
6. Write short notes on (any *two*): 8+8
(a) Waterfall Model Vs Prototype Model
(b) SDLC
(c) ISO 9001:2000.

[2 marks for neatness]

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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