**53 (IT 714) ACAR**

**2021**

# ADVANCED COMPUTER ARCHITECTURE

Paper : IT 714

*Full Marks : 100*

Time : Three hours

***The figures in the margin indicate full marks for the questions.***

*Answer **any five** questions.*

1. Briefly answer the following questions : 2×10=20

   *(i)* What is flow dependence ?

   *(ii)* What are the Diameter and Bisection width of a network ?

   *(iii)* What is a Data flow computer ?

   *(iv)* What is parallel processing ?

   *(v)* State the limitations of sequential machines.

   *(vi)* What is very fine grain parallelism ?

*Contd.*

(vii) What is Data-flow graph ? Draw the flow graph of fork operation.

(viii) What is grain packing ?

(ix) What is resource dependence ?

(x) What is MIPS rate ?

2. (i) Discuss the various mechanisms used in uniprocessor system to achieve the parallel processing. 10

(ii) Explain the various parallel computer architectures with suitable diagrams. 10

3. (i) Discuss the Flynn's classification on parallel architectures. 5

(ii) Identify the various dependencies present in the following program segment. Draw the dependence graph for the same. 5

S1 : A = B + D
S2 : C = A*B
S3 : A = A + C
S4 : E = A/2

(iii) Write the primary characteristics of a symbolic array topology. 5

(iv) Draw the data-flow graph for the following statements : 5

If $x > y$ then $(x - y)$

else $(x * y)$

endif

4. (i) Show how parallel execution is more efficient than the sequential execution by considering the following five processes.

P1 – P5

P1 : C = D*E

P2 : M = G+C

P3 : A = B+C

P4 : C = L+M

P5 : F = G/E 5

(ii) State the Bernstein conditions for parallelism. 5

(iii) Write the differences between CISC and RISC instruction set architecture. 5

(iv) Explain the Inclusion and Coherence properties of computer memory. 5

5. (i) What is Bus Arbitration ? Discuss *any three* bus arbitration schemes with suitable diagrams. 10

(ii) What is paging ? Compare FIFO, optimal and LRU page replacement algorithms considering suitable examples. 10

6. Write short notes on : ***(any four)*** 5×4=20

(i) Levels of parallelism

(ii) VLIW architecture

(iii) Locality of reference

(iv) Linear pipeline

(v) Data Hazards.

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