



DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
THIRD SESSIONAL
SUBJECT NAME : (IT506) ADVANCED MICROPROCESSOR ARCHITECTURE

Examination : B.TECH - Semester - V Seat No. :
Date : 07/10/2013 Day : Monday
Time : 11:15 TO 12:30 Max. Marks : 36

INSTRUCTIONS:

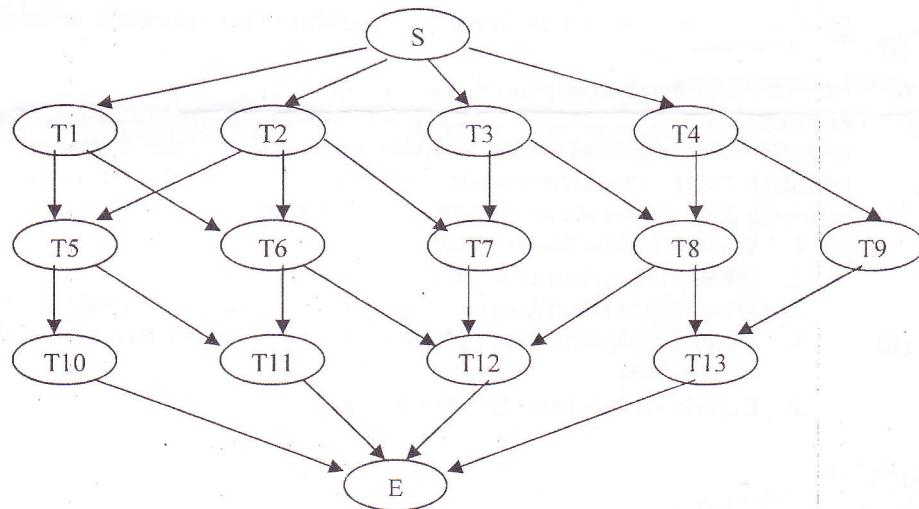
1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Answer the following.

- (a) Superscalar architecture uses both temporal and data parallelism. State true/false and justify. 02
- (b) In pipeline the maximum speedup is 5. The percentage of unconditional branches in program is 10% and conditional branches be 18%. Assume that 85% of the conditional branches are taken in the programs. Find out loss of speedup due to branches.(Assume 5 stage pipelining of SMAC2P) 02
- (c) What is locking of pipeline & when it is required? 02
- (d) "Memory Protection violation "exception can occur during which Stages of SMAC2P processor and why? 02
- (e) What is the difference between superscalar and superpipelining? 02
- (f) Register scoreboarding and renaming technique will resolve anti dependency and output dependency. How? 02

Q.2 Answer any Two.

- (a) What is Multithreading? Name 3 types of Multithreaded Processors. Briefly explain the techniques employed to schedule the thread for each type. 06
- (b) A Task graph with various tasks timing is given in Figure below. Assuming that 4 processors are available assign tasks to processors. 06



T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13
3	4	5	4	6	7	6	5	6	8	9	10	9

- (c) 1. The average number of instructions a thread executes before it suspends is 15, the delay when a thread suspends and switches to another one is 3 cycles and the average number of cycles it waits before it gets the resource it needs is 35. What is the number of threads the processor should support to hide the latency? What is the processor efficiency? (Assume 5 stage pipelining of SMAC2P) 02
2. Explain hardware modification techniques using BPB, BTB in details to reduce delay due to branches. 04
- Q.3** (a) In the examination paper there are 5 questions and each will take on average 5 minutes to correct. 2000 candidates write examination. 5 teachers are employed to correct the papers using pipeline mode. Every question is not answered by all candidates. 20% of candidates do not answer question 1, 5% question 2, 15% question 3, 10% question 4, 12% question 5. 06
1. How much time is taken to complete grading?
 2. What is the efficiency of pipeline processing?
 3. If data parallel method is used how much time will be taken to complete grading?
- (b) For the given sequence of instruction develop superscalar pipeline execution (Assume one floating point and two integer execution unit and register forwarding is applied). 06

Instruction	Number of cycle needed	Arithmetic unit needed
R2 ← R2 * R6	2	Floating point
R3 ← R2 + R1	1	Integer
R1 ← R6 + 8	1	Integer
R8 ← R2 - R9	1	Integer
R5 ← R4 / R8	2	Floating point
R6 ← R2 + 4	1	Integer
R2 ← R1 + 2	1	Integer
R10 ← R9 * R8	2	Floating point

State the various type of data dependencies between the instructions in the above program .

OR

- Q.3** (a) An examination paper has 5 questions. The answer to these questions does not take equal time to correct. Answer to question 1 takes 4 min. to correct, question 2 takes 6 minutes, question 3 takes 5 minutes, question 4 takes 5 minutes and question 5 takes 8 minutes. Due to this speed mismatch storage should be provided between teachers. Answer the following questions assuming 2000 papers are to be corrected by 5 teachers. 06
1. What is the idle time of teachers?
 2. What is the system efficiency?
 3. What will be the efficiency of system if the data parallel mode is given?
- (b) 1. Explain basic difference of instruction scheduling between superscalar and VLIW architecture. 03
 2. Explain various hazards in Pipelining. 03



DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
THIRD SESSIONAL
SUBJECT: (IT 507) INDUSTRIAL INSTRUMENTATION

Examination : B.TECH IT- Semester – V Seat No. :
Date : 10/10/2013 Day : Thursday
Time : 11:15am to 12:30pm Max. Marks : 36

INSTRUCTIONS:

1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed.

- (a) State the basic parts of differential pressure flowmeter. [2]
- (b) Classify optoelectronic sensors in the form of a tree diagram. [2]
- (c) State the most important difference between variable head and variable area flowmeters. [2]
- (d) What is inclination angle of venturi tube at the converging and diverging cone? [2]
- (e) True or False with justification: Magnetic pickup sensors produce a pulse as soon as the gear tooth comes in physical contact. [2]
- (f) True or False with justification: No other liquid except light mineral oil can be used for liquid purge system. [2]

Q.2 Attempt *Any TWO* of the following questions.

- (a) Explain Bubbler type of level measurement method in detail [6]
- (b) Explain Ultrasonic and Radiation type of level measurement methods [6]
- (c) Enlist different types of restriction elements and explain different orifices in detail [6]

**Q.3 (a) Explain Magnetic type of flowmeter in detail [6]
(b) Explain Mechanical type of tachometers in detail [6]**

OR

**Q.3 (a) Explain Turbine flowmeter in detail [6]
(b) Explain any three types of electrical tachometers [6]**



DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER V [Information Technology]
SUBJECT: (IT-505) Computer And Communication Network

Examination : Third Sessional
Date : 09/10/2013
Time : 11:15 to 12:30

Seat No. :
Day : Wednesday
Max. Marks : 36

INSTRUCTIONS:

1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed.

[12]

[2]

[2]

[2]

[2]

[1]

[1]

[1]

[1]

[1]

[1]

[1]

[1]

[12]

Q.2 Attempt Any TWO of the following questions.

[6]

- a What is delayed duplicate? Give various solution of it and protocol scenarios for establishing a connection using Three-way-handshake.

[6]

- b Explain the protocol scenarios for releasing a connection using Three-way-handshake.

[6]

- c The following is a dump of a TCP header in hexadecimal format.

[6]

06320028 00060008 10200000 500107F8 03200000

(1) What is the source port number?

(2) What is the destination port number?

(3) What is the sequence number?

(4) What is the type of segment?

(5) What is the length of header?

(6) What is the window size?

- 3(a) Consider an instance of TCP's use slow start algorithm with threshold where the window size at the start of the slow start phase 2 MSS and the threshold at the start of the first transmission is 8 MSS assume that the time out occurs during the fifth transmission Find the congestion window size at the end of tenth transmission.

[6]

- Q.3(b) Explain domain name system.

[6]

-OR-

- Q.3(a) Consider that a TCP sender, Host A, wants to send 21,000 bytes to Host B. The RTT is 50ms. The maximum segment size (MSS) is 1460 bytes, the initial congestion window is 1460bytes (1 MSS), and the initial slow-start threshold is 500 MB.

[2]

(I) How many TCP segments will it take to send the 21,000 bytes?

[2]

(II) How many RTT rounds will it take to send the 21,000 bytes, ignoring connection setup?

[2]

(III) How large (in segments) will the congestion window be in the last round?

- Q.3(b) (I)What are TSAP and NSAP explain with diagram?

[4]

(II)Why shouldn't we set the TCP timeout value to be extremely large to avoid early timeouts?

[2]



DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER V [IT]
SUBJECT: Design and Analysis of Algorithm

Examination : 3rd Sessional Exam
Date : 08/10/2013
Time : 11:15 to 12:30

Seat No : _____
Day : Tuesday
Max. Marks : 36

INSTRUCTIONS:

1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Answer the following Questions.

- (a) What is importance of priority list in branch & bound technique? [2]
(b) Explain live node, dead node & E-node. [2]
(c) Is the solution feasible for given 15-tiles puzzle game? Explain with justification [2]

1	3		5
7	8	9	6
4	2	10	12
11	13	14	15

- (d) State and Explain the Cooks Theorem? [2]
(e) Define the Algorithmic Gaps. Also give their importance. [2]
(f) Explain the notion of reducibility with example. [2]

Q.2 Answer any two of the following Questions.

- (a) What is Satisfiability(SAT) problem? Show that SAT is in NP [6]
(b) Give the Decision Tree Model of computing? Also find the lower bound on sorting problem using the same. [6]
(c) Explain the state space model for estimating lower bound on problem using suitable example. [6]

Q.3 Answer the following Questions.

- (a) Write down n-queen problem algorithm with proper steps. [6]
(b) Solve the job assignment problem using Branch and Bound [6]

	1	2	3	4
A	15	12	13	40
B	14	17	18	28
C	5	15	19	23
D	10	14	20	22

OR

Q.3 Answer the following Questions.

- (a) Write down graph coloring algorithm with proper steps [6]
(b) Solve the knapsack problem using branch and bound.
n=4 m=15 (p₁, p₂, p₃, p₄) = (12, 12, 15, 18)
(w₁, w₂, w₃, w₄) = (3, 5, 8, 10)



DHARMSINH DESAI UNIVERSITY, NADIAD

FACULTY OF TECHNOLOGY

B.TECH. SEMESTER V [IT]

SUBJECT: (IT502) DATABASE MANAGEMENT SYSTEM

Examination : Third Sessional

Seat No. : _____

Date : 12/10/2013

Day : Saturday

Time : 11.15 to 12.30

Max. Marks : 36

INSTRUCTIONS:

1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed.

[12]

(a) In shadow copy technique when database is updating then b-pointer points to

[1]

(A) Old copy of database (B) New copy of database

(C) Both old and new copy of database (D) Does not point anywhere

(b) The drawback of shadow paging technique are

[1]

(A) Commit overhead (B) Data fragmentation

(C) Garbage collection (D) All of these

(c) In strict phase locking protocol

[1]

(A) All exclusive mode lock taken by transaction be held until transaction commits

(B) All exclusive mode lock taken by transaction can be released before transaction commits

(C) All locks can be released before transaction commits

(D) None of these

(d) Cascading rollback can be avoided by

[1]

(A) Two phase locking protocol (B) Strict two phase locking protocol

(C) Cannot be avoided (D) Can be avoided but there is no actual protocol

(e) Suppose there are three transactions T22, T23, T24 with time stamp 10, 20, 30. Now T23 occupy a data item which is required by T22 and T24. Among the four possibilities what will be true in wait die scheme.

[2]

(A) if T22 request the data item, T22 will wait

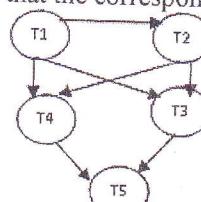
(B) if T24 request the data item, T24 will wait

(C) if T22 request the data item, T23 will wait

(D) if T24 request the data item, T23 will wait

(f) From the following graph we can say that the corresponding schedule is

[2]



(A) View Serializable

(B) Conflict Serializable

(C) Both view and conflict serializable

(D) Not serializable schedule

(g) What is cursor? Explain types with example.

(h) Consider the schedule of three transactions T1, T2 and T3. S : R2(A); R2(B); W2(A); R2(B); R3(A); W1(B); W3(A); W2(B). Where R stands for READ, W for WRITE and schedule no.

[2]

Determine schedule is serializable or not. If so give the serial schedule.

Q.2 Attempt any two from the following.

[12]

(a) Explain graph based protocol.

[6]

(b) Answer the following.

[6]

1. Compare the shadow paging with the log-based techniques.

[2]

2. What is the recoverable schedule and non-recoverable schedule?

[2]

3. What is the difference between serial and serializable schedule?

[2]

(c) Explain 2-phase commit protocol with how it handles failures of distributed database system.

[6]

- Q.3** (a) Consider three transactions: T1, T2, T3 and T4. Draw the precedence graph for the Following [6] schedule and determine whether it is Serializable OR not. If so, give its serial order(s).

Time	T1	T2	T3	T4
t1 :				
t2 :	read(A)			read(C)
t3 :				
t4 :		read(B)		write(B)
t5 :			write(B)	
t6 :	read(C)			
t7 :	write(A)			
t8 :			read(A)	
t9 :	write(B)			
t10 :			write(A)	
t11 :				read(A)
t12 :				write(A)

- (b) Explain time-stamp ordering protocol.

[6]

- Q.3** (a) What is deferred modification technique for recovery? How does recovery take place in case of [6] failures in this technique?

- (b) Explain multiple granularity protocol.

[6]

OR



DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER V [IT]
SUBJECT: DISCRETE MATHEMATICS

Examination : Third Sessional **Seat No. :** _____
Date : 11/10/2013 **Day : Friday**
Time : 11.15 to 12.30 **Max. Marks : 36**

INSTRUCTIONS:

1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed.

- (a) Let $(A, *)$ be the finite group, and H is subset of A . Also H is closed under $*$. Is $(H, *)$ [2] subgroup of $(A, *)$? Justify your answer.
- (b) Let G be a group under $*$ and $O(G) = 15$, what are the order of its all possible [2] subgroups?
- (c) Let $a_r = 1, r = 0$ and $c_r = 1, r = 0$; [2]
 $= 0, r=1$ $= 0$ otherwise
 $= -4, r=2$
 $= 0$ otherwise
if $c_r = a_r * b_r$ then $b_r = ?$
- (d) Give an Example of finite ring which is not field. Also explain why it is not a field. [2]
- (e) Let 1 be a universal upper bound then prove that $a \vee 1 = 1$ and $a \wedge 1 = a$ [2]
- (f) Solve the difference equation $a_r - a_{r-1} = 7$ [2]

Q.2 Attempt Any Three from the following questions.

- (a) Prove that $\ker(f)$ of ring $(G, +, \cdot)$ is a ideal
- (b) State and prove absorption property for lattice.
- (c) If $A(z) = \frac{z}{(1-z)(1+7z)}$ then what is $a_r = ?$
- (d) Solve: $a_r - 6a_{r-1} + 9a_{r-2} = (r+1)3^r$

Q.3 (a) Let $(A, \vee, \wedge, -, \sim)$ be a finite Boolean algebra. Let b be any non zero element in A , and [4] a_1, a_2, \dots, a_k be all the atoms of A such that $a_i \leq b$, then prove that

$$b = a_1 \vee a_2 \vee \dots \vee a_k$$

- (b) State and prove Langrange's theorem.

- (c) Evaluate the sum: $1^2 + 2^2 + 3^2 + \dots + r^2$ using generating function method. [4]

OR

- Q.3 (a) Solve $a_r = 3a_{r-1} + 2$ $r \geq 1$ given that $a_0 = 1$ by generating function method.** [4]
- (b) State and prove De'Morgan's Law for lattice. [4]
- (c) Prove that finite integral domain is a field. [4]