## S.Y. B.Sc. (Computer Science) (Sem. – I) Examination, 2009 COMPUTER SCIENCE – I CS -211 : Data Structures, Image Structures and Related Algorithms in 'C' – I (2004 Pattern)

Time : 2 Hours

Max. Marks: 40

 $(1 \times 10 = 10)$ 

- N.B.: 1) All questions are compulsory.
  - 2) Figures to the **right** indicate **full** marks.
  - 3) Write readable answers.
- 1. Attempt **all** of the following :
  - 1) Define the term 'Data structure'.
  - 2) Write the time complexity of sequential search method.
  - 3) Convert the following infix expression to postfix form  $(A+B) * (C \ (D-E) + F) G.$
  - 4) What are sparse matrices ?
  - 5) Define the term 'Generalized lists'.
  - 6) Define Output-Restricted double ended queue.
  - 7) What is sibling ?
  - 8) Differentiate between binary tree and binary search tree.
  - 9) Give any two graph traversal methods.
  - 10) What do you mean by collision ?
- 2. Attempt **any two** of the following :
  - a) Write a 'C' function to create binary search tree recursively.
  - b) Write a 'C' function to merge two linked list into a third list so that the elements are in sorted order.
  - c) Write a 'C' function named delete-Q which deletes an element from a linked queue of integers.

 $(2 \times 5 = 10)$ 

- 3. Attempt **any tw**o of the following :
  - a) Write adjacency matrix of following graph. Calculate indegree and outdegree of each vertex in graph.



- b) Apply the insertion sort algorithm to the following data set :47, 26, 98, 22, 82, 32, 79, 36.
- c) Construct a Binary Search Tree for the following data and give inorder, preorder and post order tree traversal
  10, 15, 20, 25, 30, 35, 40, 7, 9.

4.	Atten	$ (1 \times 10 = 3) $	10)
	A) a)	Consider three memory blocks 300, 100, 60. Show the allocation sequence for requests of size 75, 55, 100, 80 using all allocation methods.	4
	b)	Explain chaining in detail.	4
	c)	Construct an expression tree for following expression and show inorder tree traversal.	2
		(A+B*C)/((A+B)*C).	

3/4 1/4

 $1/_{2}$ 

## 

B) a) Convert the given expression to postfix form and show stack content. ((P \* Q) + (R - S)) / T.

-3-

b) Find shortest path for a given graph, with starting vertex -1.



c) Calculate average turn around time using round robin method. Given time slice = 4.

Jobs	Burst-Time
$\mathbf{J}_{1}$	10
$\mathbf{J}_2$	5
J <sub>3</sub>	4
$\mathbf{J}_4$	3

*B/11/09/1,050* 

2

4

## S.Y. B.Sc. (Computer Science) (Sem. – I) Examination, 2009 COMPUTER SCIENCE – II CS – 212 : File Structures and Database Concepts – I (2004 Pattern)

Time : 2 Hours

N.B.: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat diagrams wherever necessary.

#### 1. Attempt **all** the following :

- a) What is latency time ?
- b) State the limitations of magnetic tape.
- c) State two record types.
- d) What is direct file ?
- e) State the disadvantages of B tree over B + tree.
- f) Define DBMS.
- g) What is DDL and DML?
- h) What is weak entity ?
- i) Explain 'project' operation of relational algebra.
- j) What is specialization ?

#### 2. Attempt **any two** of the following :

- a) Compare RAID levels in detail.
- b) Differentiate the following :
  - i) Sparse and Dense Index
  - ii) Primary and Secondary Index.
- c) Explain dynamic hashing.

Max. Marks: 40

(10×1=10)

 $(2 \times 5 = 10)$ 

[3618] - 102

(2×5=10)

- 3. Attempt **any two** the following :
  - a) Explain advantages of DBMS.
  - b) Consider the entities and relationships

Emp (emp-no, emp-name, sal)

Dept (Dept-no, dept-name, loc)

Emp and Dept are related with m-1. Create RDB and solve following queries in relational algebra.

- 1) List all employees whose salary is greater than '10,000'.
- 2) List all departments located in 'Delhi'.
- 3) List all employees who are working in 'Pune' city.
- 4) List all departments from the organization.
- c) Consider following entities and relationships

Movie (M-no, M-name, release-yr)

Actor (A-no, A-name)

Movie and Actor are related with m-m. Create RDB and solve following queries in relational algebra.

- 1) Display all movie names having 'Amitabh' as a actor.
- 2) Display all actor names who worked in movie 'Lagan'.
- 3) List all movie names released in 2008.
- 4) List all actors.
- 4. Attempt the following :
  - a) Consider a 'trucking company' which is delivering shipments to different stores. A truck may carry several shipments and deliver it to multiple stores.

	1) Draw ER diagram.	3
	2) Design relational database.	4
b)	What is generalization? Explain with example.	3
	OR	
c)	Explain:	3
	1) Hierarchical data model.	
	2) Network data model.	
	3) Relational data model.	

## S.Y. B.Sc. (Comp. Science) (Semester – I) Examination, 2009 Paper – I : MATHEMATICS MTC – 211 : Linear Algebra (2004 Pattern)

Time : 2 Hours

#### Instructions : 1) All questions are compulsory. 2) All questions carry equal marks.

1. Attempt all questions :

i) Write the solution set of the linear equation  $x_1 + x_2 + x_3 - 2x_4 = 0$ .

ii) If 
$$A = \begin{bmatrix} -2 & 1 & 2 & 3 \\ 0 & 3 - 1 & 0 \\ 0 & 0 & 4 & 2 \\ 0 & 0 & 0 & 9 \end{bmatrix}$$
 then evaluate det (A).

- iii) Let  $V = IP_3$  is a finite dimensional vector space. Find dimension of V.
- iv) Let  $S = \{(1, 2, 3), (-2, 3, 4), (3, 9, 2), (4, 0, 1)\}$  be a subset of  $\mathbb{R}^3$ . Determine whether the set S is linearly dependent.
- v) Consider the Euclidean inner product space  $\mathbb{R}^3$ . For which value of 'K' the vectors  $\overline{u} = (K, K, 1)$  and  $\overline{v} = (5, K, 6)$  are orthogonal.
- vi) Find the eigen values of the matrix  $A = \begin{bmatrix} 2 & 0 \\ 0 & 3 \end{bmatrix}$ .
- vii) If A be any square matrix with det(A) = 10, then find  $det(5.A^{-1})$ .
- viii) Define : Norm of a vector.
- ix) A mapping T :  $\mathbb{R}^2 \longrightarrow \mathbb{R}^2$  be a linear transformation defined by T(x, y) = (2x y, -8x + 4y). Determine whether the vector  $\overline{w} = (5, 10)$  is in Ker(T).
- x) If 2, 3, 4 are eigen values of the matrix A, then find eigen values of  $A^3$ .

**P.T.O.** 

## [3618] - 103

Max. Marks: 40

- 2. Attempt **any two** of the following :
  - i) Solve the following system of linear equation by Gaussian elimination method 3x + 2y - z = -15 5x + 3y + 2z = 0 3x + y + 3z = 11-6x - 4y + 2z = 30
  - ii) If A is a non-singular matrix then prove that det  $[adj (A)] = [det (A)]^{n-1}$ .
  - iii) Determine the basis and dimension for the subspace S of  $\mathbb{R}^3$ . Where  $S = \{(x, y, z)/4x - 2y + 5z = 0\}$ .
- 3. Attempt any two of the following :
  - i) Suppose  $S = \{\overline{v}_1, \overline{v}_2, \overline{v}_3, ..., \overline{v}_r\}$  is a basis for an inner product space V. Prove that the zero vector is the only vector in V which is orthogonal to every basis vector.
  - ii) Evaluate the determinant of the following matrix by row reduction method.
    - $\begin{bmatrix} 3 & 3 & 0 & 5 \\ 2 & 2 & 0 & -2 \\ 4 & 1 & -3 & 0 \\ 2 & 10 & 3 & 2 \end{bmatrix}.$
  - iii) Find all eigenvalues of the following matrix A. Hence find eigen values of  $A^{-1}$ .

where,  $A = \begin{bmatrix} 4 & 0 & 1 \\ -2 & 1 & 0 \\ -2 & 0 & 1 \end{bmatrix}$ .

10

-2-

- 4. Attempt **any one** of the following :
  - i) a) Let  $T : \mathbb{R}^4 \longrightarrow \mathbb{R}^3$  be the linear transformation given by the formula  $T(x_1, x_2, x_3, x_4) = (4x_1 + x_2 - 2x_3 - 3x_4, 2x_1 + x_2 + x_3 - 4x_4, 6x_1 - 9x_3 + 9x_4).$ Find bases for Kernel of T. Hence find nullity and rank of T.
    - b) Let W be the subspace of the Euclidean inner product space  $\mathbb{R}^3$  spanned by the orthonormal set

$$\left\{ \left(\frac{1}{\sqrt{2}}, 0, \frac{1}{\sqrt{2}}\right), \left(\frac{1}{\sqrt{2}}, 0, \frac{-1}{\sqrt{2}}\right) \right\}$$

Express the vector  $\overline{V} = (1, 1, 1)$  in the form  $\overline{V} = \overline{w}_1 + \overline{w}_2$ , where  $\overline{w}_1$  is in W and  $\overline{w}_2$  is orthogonal to W.

- ii) a) If T:V → W is a linear transformation then prove that the range of T is a subspace of W.
  - b) Let ℝ<sup>3</sup> be a vector space. Determine whether the set {(2, -1, 3), (4, 1, 2), (8, -1, 8)} span ℝ<sup>3</sup>.

*B/II/09/965* 

## S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2009 MATHEMATICS (Paper – II) MTC - 212 :Algebra (2004 Pattern)

Time : 2 Hours

Instructions :1) All questions are compulsory.

- 2) All questions carry equal marks.
- 3) Figures to the **right** indicate **full** marks.
- 1. Attempt **all** questions :
  - i) On Z<sup>+</sup>, a binary operation '\*' is defined by a \* b = a. Is '\*' commutative ? Justify.
  - ii) List all the elements of order 3 in  $(\mathbb{Z}_{12}^*, \mathbb{X}_{12})$ .
  - iii) Find  $\phi$  (28), where  $\phi$  is a Euler's  $\phi$  function.
  - iv) Is  $(\mathbb{Z}^{+}, \mathbb{X})$  a monoid ?
  - v) State whether (1, 6) (2, 5, 3) is even or odd. Why?
  - vi) Give an example of infinite cyclic group.
  - vii) Find the number of left cosets of the subgroup.  $\langle \overline{18} \rangle$  of  $\mathbb{Z}_{36}$ .
  - viii) What is the Hamming distance between 111010110 and 101010101?
  - ix) Let  $\mathbb{R}^*$  be a group of non-zero real numbers under multiplication. Let the functions  $\phi : \mathbb{R}^* \to \mathbb{R}^*$  defined by  $\phi(x) = |x|$  be a homomorphism. Find kernel of  $\phi$ .
  - x) Let A = {2, 4, 6, ....} and define a binary operation '\*' on A by a \* b = a + b. Is (A, \*) a semigroup ?

## [3618] - 104

Max. Marks: 40

#### [3618] - 104

2. Attempt **any two** of the following :

i) Let 
$$G = \begin{cases} \begin{bmatrix} 1 & a \\ 0 & 1 \end{bmatrix} a \in \mathbb{R} \end{cases}$$
.

Prove that G is a group with respect to usual matrix multiplication.

ii) Let G be a group and let  $a \in G$ .

Then prove that

$$\mathbf{H} = \left\{ \mathbf{a}^{n} \middle| n \in \mathbb{Z} \right\} \text{ is a subgroup of } \mathbf{G}.$$

- iii) Prove that every cyclic group is abelian.
- 3. Attempt **any tw**o of the following :

i) Let 
$$\sigma = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 4 & 2 & 5 & 3 & 1 \end{pmatrix}$$
  
and  
 $\tau = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 3 & 5 & 4 & 2 & 1 \end{pmatrix}$ 

Find a)  $\sigma \circ \tau$  b) O ( $\sigma$ ) c) O( $\sigma \circ \tau$ ) d)  $\sigma^{-1}$ 

- ii) A homomorphism φ of a group G is a one-to one function if and only if the kernel of φ is {e}.
- iii) Let G be a group with G = (a), O(G) = n. Then prove that  $(a^m) = G$  if and only if (m, n) = 1.
- 4. Attempt any one of the following :
  - i) a) Construct the decoding table for {0000, 0011, 1101, 1110}.
    - b) Let G be a group and H be a non-empty subset of G. If  $a, b \in H$  implies  $ab^{-1} \in H$ , then show that H is a subgroup of G.
  - ii) a) If H and K are normal subgroups of G, then show that  $H \cap K$  is also a normal subgroup of G. What about  $H \cup K$ ?
    - b) Encrypt the message "WENT " by using RSA cryptosystem with p = 41, q = 47, e = 3.

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## S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2009 ELC 211 : ELECTRONICS – I **Computer Organization** (2004 Pattern)

Time : 2 Hours

**Instructions** : a) All questions are compulsory. b) Figures to the **right** indicate **full** marks. c) Neat diagrams must be drawn wherever necessary.

- 1. Answer the following in **one** or **two** sentences :
  - a) What is the limitation of strobe controlled asynchronous data transfer?
  - b) What is the need of input-output interface in computer system?
  - c) In a computer bus system, what EISA stands for ?
  - d) Define 'Cache Miss'.
  - e) What is write back method in cache organization?
  - f) Why expansion buses are required in a computer system ?
  - g) What is the function of FULL and EMPTY flags in register stack organization?
  - h) What are the different methods used to design hardwired control unit?
  - i) How many I/O devices can be handled by Universal Serial Bus (USB)?
  - i) How many address lines are required to address 1MB of memory?
- 2. Attempt **any two** of the following :
  - a) Explain associative mapping procedure of cache memory organization.
  - b) How interrupts are handled when more than one interrupt requests arrive simultaneously in Daisy chaining method?
  - c) Explain the delay element method of hardwired control unit.

## [3618] - 105

Max. Marks: 40

 $(1 \times 10 = 10)$ 

#### $(5 \times 2 = 10)$

- 3. Attempt **any two** of the following :
  - a) Explain the microprocessor based system with neat block diagram.
  - b) Explain with timing diagram, handshaking method of asynchronous data transfer.
  - c) Write the features of ISA bus.
- 4. Attempt **any one** of the following :
  - a) Explain paging and segmentation methods used in virtual memory addressing.
  - b) i) What is memory hierarchy ? Explain with block diagram 3 level memory hierarchy.
    - ii) With a neat block diagram explain DMA controller.

*B/II/09/1,415* 

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 $(10 \times 1 = 10)$ 

 $(5 \times 2 = 10)$ 

## S.Y. B.Sc. Computer Science (Semester–I) Examination, 2009 ELC 212 : ELECTRONICS – II Process Control Instrumentation (2004 Pattern)

Time : 2 Hours

#### Instructions : 1) All questions are compulsory.

- 2) Figures to the **right** indicate **full** marks.
- 3) Neat diagrams must be drawn wherever necessary.
- 1. Answer the following in **one** or **two** sentences :
  - a) Define a photovoltaic cell.
  - b) A thermocouple is used to measure temperature of 500°C to 1225°C. Determine the span of this thermocouple.
  - c) What is an aperture time ?
  - d) Define a process load.
  - e) State the working principle of LVDT.
  - f) Which circuit is used to freeze the input signal during data conversion ?
  - g) Write equation for the output of a PID controller.
  - h) Which material is the best for a RTD sensor ?
  - i) State any two types of analysis which can be done with PSPICE.
  - j) What is a transfer function of a system ?
- 2. Attempt **any two** of the following :
  - a) Explain semiconductor strain guage and write its applications.
  - b) With a neat block diagram explain multichannel DAS using analog multiplexer.
  - c) An integral controller is used for speed control with a set point of 26 rpm within a range of 20-30 rpm. The controller output is 30% initially. The constant  $K_i = 0.20\%$ . If the speed increases to 28.5 rpm, calculate output of a controller after 5 seconds for a constant error  $e_p$ .

 $(1 \times 10 = 10)$ 

[3618] - 106

Max. Marks: 40

 $(5 \times 2 = 10)$ 

- 3. Attempt **any two** of the following :
  - a) Explain with neat diagram working of a four position stepper motor.
  - b) Draw a flowchart for DAS having multiplexing after A/D conversion. Define any two parameters of DAS.
  - c) List different optical sensors and explain how laser diode can be used for Label inspection application.
- 4. Attempt **any one** of the following :
  - a) i) Explain the working principle of a thermocouple. Why cold-junction compensation is required ?
    - ii) Explain with neat diagram the elements of process control system.
  - b) i) Derive the first order differential equation for a fluid level in a water tank.
    - ii) A speed control system has a range of 320 to 520 mm/s. If the setpoint is 435 mm/s and the measured value is 350 mm/s, calculate the error as a percentage span.

*B/II/09/1,055* 

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 $(10 \times 1 = 10)$ 

## S.Y. B.Sc. Computer Science (Semester – I) Examination, 2009 **ENGLISH (General) (2004 Pattern)**

## Time : 2 Hours

1. Read the following passage carefully and answer the questions given below :

The Equipment Company is the world's largest producer of interactive computer systems. Our software products demand the very best Software editors and writers to create outstanding documentation. Therefore, we are looking for a number of highly talented documentation specialists to undertake a wide range of challenging assignments. In order to obtain the best, we offer excellent working conditions and benefits. Interesting and satisfying work, however, remains our key selling point.

An editing candidate should have 2-3 years of editing experience in a technical environment. Strong literary skills and a knowledge of production techniques are essential. Familiarity with computer fundamentals would be helpful but is not required. A Bachelor's degree in English, technical writing or a related field would be preferred.

1)	What is the above passage about ?	2
2)	What is the company looking for ?	2
3)	What are the company's key-selling points ?	2
4)	Which of the following is NOT necessary for the job that is advertised ?	2
	a) 2-3 years of experience	
	b) Strong literary skills	
	c) Familiarity with computer fundamentals	
	d) Knowledge of production techniques.	
5)	Give the synonyms of :	2
	a) Assignment	
	b) Essential	

Total Marks: 40

[3618] - 107

-2-

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5

5

5

- 2. A) Write a summary-note of the following dialogue.
  - Smith : I understand you've become a real cook lately, Frank.
  - Frank : Well, since my wife began working, I decided to help out by making the meals every once in a while.
  - Smith : That's very considerate of you.
  - Frank : Oh yeah! Besides I have the knack of cooking better than my wife.
  - Smith : Really ? Then I think you should invite me for dinner.
  - Frank : Anytime. You're most welcome.

OR

- 2. A) Prepare an outline for a speech on 'Awareness on Swine Flu'.
- 2. B) The following are parts of sentences. Put them in proper order to make meaningful sentences (any 5) :
  - 1) Today tourists \_\_\_\_\_\_eagerly visit \_\_\_\_\_\_of this island \_\_\_\_\_\_ from many areas \_\_\_\_\_\_ the palaces and forts.
  - by it's great power \_\_\_\_\_ when Tsunami \_\_\_\_\_ it, causes \_\_\_\_\_ strikes everywhere \_\_\_\_\_ extensive damage.
  - 3) we lose \_\_\_\_\_\_ on machines \_\_\_\_\_\_ if we are \_\_\_\_\_\_ our individuality \_\_\_\_\_\_ totally dependent.
  - 4) make you \_\_\_\_\_ his performance \_\_\_\_\_ Don't let feel jealous.
  - 5) sang quite \_\_\_\_\_\_ because \_\_\_\_\_\_ she really deserved \_\_\_\_\_\_ well \_\_\_\_\_\_ the prize.
  - 6) this skill \_\_\_\_\_\_ it is only \_\_\_\_\_\_ possess \_\_\_\_\_\_ of America that \_\_\_\_\_\_ the monkeys.
  - 7) strength of \_\_\_\_\_ weight training \_\_\_\_\_ one of the great \_\_\_\_\_ your heart \_\_\_\_\_ merits of \_\_\_\_\_ is the

3. A) C	hoose the correct ey word in the fol	alternative you be llowing ( <b>any 5</b> ) :	elieve is nearest i	n meaning to the underlined	5
1)	) A <u>boastful</u> pers	on spoils the fun	of the gathering		
	a) arrogant	b) rude	c) proud	d) cynical	
2)	) One must be <u>pa</u>	ntient to avoid con	nflicts.		
	a) understandir	ng	b) friendly		
	c) tolerant		d) thoughtful		
3)	) Fertile soil cont	tributes to <u>rampar</u>	<u>nt</u> growth of plan	nts.	
	a) weak	b) thorny	c) unchecked	d) short	
4)	) Dickens depicte	ed the life of mine	ers in his literary	works.	
	a) deleted	b) estimated	c) decorated	d) represented	
5)	) The possibility	of danger gave ze	est to the advent	ure.	
	a) love	b) interest	c) fear	d) gusto	
6)	) The customs of	fficer confiscated	goods at the air	r-port.	
	a) stole	b) snatched	c) grabbed	d) seized	
7)	) The juggler <u>dis</u>	<u>played</u> uncanny t	ricks using colou	ared balls.	
	a) lectured	b) exhibited	c) controlled	d) played	
3. B) G	vive possible varia	ations of the follo	owing sentences	(any 5) :	5
1)	) No sooner did t	he parents leave	the house than the	he kids grew noisy.	
	As soon as				
2)	) Though she had	l mastered the art	, she failed mise	erably.	
	Inspite of				
3)	) The burglar suc	ceeded in breaki	ng the safe.		
	The safe				
4)	) Did his behavio	our hurt you ?			
	Were you				
5)	) Tagore was a d	ramatist and poet	t.		
	Besides				
6	) We could not re On account of	each college on ti	me because of h	eavy rains.	
7)	) Gopal could no Due to	ot afford good ed	ucation because	he was poor.	

- 4. A) Restate the following sentences avoiding ambiguity, redundancy, circumlocutions, repetition or clumsiness (**any 5**).
  - 1) I play football and I play hockey.
  - 2) Walking along the road, the car hit him.
  - 3) The students must have studied very hard and the students must have passed.
  - 4) The piano table was sold by the woman with carved legs.
  - 5) The man committed suicide after bidding goodbye to his friend with a pistol.
  - 6) Shyam presented a toy to his brother that was battery-operated.
  - 7) The farmer reaped the corn and made a bundle with a sickle.
- 4. B) Make words by adding suffixes to each of the following and use them in your own sentences (any 5) :
  - 1) Democrat
  - 2) Inform
  - 3) Notice
  - 4) Fatal
  - 5) Office
  - 6) Promote
  - 7) Skill.

*B/II/09/385* 

#### 

5

## S.Y.B.Sc. (Computer Science) (Semester – I) Examination, 2009 CS – 211 : DATA STRUCTURES USING 'C' (Paper – I) (New) (2008 Pattern)

Time: 2 Hours

Instructions : 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Write readable answer.
- 1. Attempt **all** of the following :
  - a) Define ADT.
  - b) Arrange the following time complexities in decreasing order.

 $O(2^{n}), O(\log_{2}n), O(n), O(n^{3}), O(n^{2}) O(n\log_{2}n)$ 

- c) Give any one example of unstable sorting method.
- d) Give the representation of generalized list B = (p(q, r)s).
- e) Give any 2 applications of stack.
- f) Give one advantage of Dequeue.
- g) Create a binary search tree for following words Tushar, Amit, Beena, Pranav, Hemant, Neeta.
- h) Which data structure is used in depth first search ?
- i) "Queuefull condition in a queue necessarily implies that there is no free space in the array" Justify True/False.
- j) Define Balance Factor.

Max. Marks: 40

 $(10 \times 1 = 10)$ 

[36	18] – 11 -2-	
2.	Attempt <b>any two</b> of the following :	(2×5=10)
	a) Write a 'C' function to reverse a singly link list.	
	b) Write a 'C' function to calculate the height of a binary tree.	
	c) Write non recursive C function to perform preorder tree traversal.	
3.	Attempt <b>any two</b> of the following :	(2×5=10)
	a) What are the different asymptotic notations ? Explain any 2.	
	b) Consider the following set of numbers sort them using quick sort. Clea the pivot element and partition at each step	arly indicate
	22, 56, 50, 39, 14, 94, 88, 09	
	c) Write an algorithm for Breadth first search of a graph.	
4.	Attempt either <b>A</b> or <b>B</b> :	(1×10=10)
	<ul><li>A) a) Write a C function for manipulating a linked queue as follows.</li><li>i) Insert an item into the queue.</li><li>ii) Delete an item from the queue.</li></ul>	3

b) For the following graph compute shortest path and distance between a and h. 4



	-3-	[3618] – 11
<b>c)</b> ]	Explain the following terms :	3
	a) Strictly Binary tree	
1	b) AOV Network	
	c) Multiple Queue	
B) a) '	Write a C function for Bubble sort of integers.	3
b) ]	Define Expression tree :	
	Give inorder preorder postorder traversal for the following tree.	4



c) Consider the following postfix expression PQ + RS - \*Give steps for evaluation when P = 9, Q = 8, R = 7, S = 4.

*B/II/09/8,965* 

## S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2009 CS – 212 : RELATIONAL DATABASE MANAGEMENT SYSTEM (RDBMS) (New Course) (2008 Pattern)

Time: 2 Hours

## **N.B.**: 1) All questions are compulsory. 2) Figures to the **right** indicate **full** marks.

- 1. Attempt all of the following:
- a) What is meant by the term audit trail ?
- b) What is the output of the following command? Select replace ('Lotus is a beautiful flower', 'Lotus', 'Rose');
- c) Comment and justify. 'The DBA is responsible for handling database security'.
  - d) What is the significance of cursor FETCH statement of MySQL ?
    - e) Define non-recoverable schedule.
    - f) What is the usage of REVOKE command of MySQL ?
      - g) What is meant by thin client ?
- h) Write a procedure in MySQL which will accept employeenumber as input and delete the record of specified employee from the employee table whose fields are (employeenumber, name, salary)
  - Define deadlock. i)
- Write a MySQL query to get the names of first three employees earning highest j) salary from employee table.

[3618] – 12

Max. Marks: 40

 $(10 \times 1 = 10)$ 

	<b>[8] – 12</b> -2-	[36]
$(2 \times 5 = 10)$	Attempt <b>any two</b> of the following :	2.
ed during	a) Define transaction. Explain how atomicity and durability are maintain transaction execution.	
	b) Explain the role of middle-tier in three-tier client-server architecture.	
s for	c) What is meant by transaction rollback ? Why is it necessary to check cascading rollback ?	
(2×5=10)	Attempt <b>any two</b> of the following :	3.
	a) Consider the following log image obtained after a system crash.	
	[ start-transaction, $T_1$ ]	
	[write-item, $T_1$ , A, 25]	
	[commit, T <sub>1</sub> ]	
	[start-transaction, $T_4$ ]	
	[write-item, $T_4$ , $B$ , 21]	
	[write-item, $T_4$ , C, 25]	
	[commit, T <sub>4</sub> ]	
	[check point]	
	[start-transaction, $T_2$ ]	
	[write-item, T <sub>2</sub> , B,10]	
	[commit, T <sub>2</sub> ]	
	[start-transaction, $T_3$ ]	
	[write-item, $T_3$ , A, 30]	
	[write-item, $T_3$ , D, 25]	
	system crash !!!	

State the transactions that will be undone/redone if defferred update protocol with checkpoint recovery scheme is used. Justify your answer.

b) What is the usage of precedence graph ? Consider a following schedule with 3 transactions.



Draw precedence graph for above. What you judge from the graph ? Explain.

- c) Explain the various levels at which security measures are taken.
  - 4. Attempt the following:
- a) Consider a table emp (emp-no, name, salary). Write a trigger in MySQL to check salary when record is added or modified such that if salary < 0, it is set to zero or if it is greater than 25,000, then set it to 25,000.
  - b) Compare binary locks to exclusive/shared locks.

ЯО

- b) i) Define following:
  - 1) Timestamp
  - 2) Starvation
- 3) Phantom record.
- ii) Describe wound-wait protocol for deadlock prevention.

*B/II/09/8,965* 

 $(2 \times 5 = 10)$ 

## S.Y. B.Sc. (Comp. Science) (Semester – I) Examination, 2009 MATHEMATICS (Paper – I) MTC – 211 : Linear Algebra (New Course) (2008 Pattern)

Time: 2 Hours

## Instructions : 1) All questions are compulsory. 2) All questions carry equal marks.

- 1. Attempt **all** questions :
  - i) What is the condition on a square matrix A such that the system AX = B has unique solution ?
  - ii) Let V be the vector space of all 2×2 real matrices with matrix addition and scalar multiplication. Determine whether the set

$$S = \left\{ \begin{pmatrix} a & b \\ c & d \end{pmatrix} / a = 1 \right\} \text{ is subspace of V.}$$

- iii) If 4, 4, 3 are eigenvalues of the matrix A then find the eigen values of 3A.
- iv) Determine whether a map  $T : \mathbb{R}^2 \to \mathbb{R}^2$  defined by T(x, y) = (x + y + 1, y) is a linear transformation.
- v) Let  $\mathbb{IP}_3$  be the vector space of all polynomials of degree  $\leq 3$ . Write standard basis for  $\mathbb{IP}_3$ .
- vi) For what value of 'K' does the following system has trivial solution.

kx + 2y = 0

$$-3x - 5y = 0$$

vii) If  $T : \mathbb{R}^7 \to \mathbb{R}^3$  be a linear transformation with nullity (T) = 3, then find rank (T).

-

[3618] – 13

Max. Marks: 40

10

P.T.O.

- viii) A set  $S = \{(1, 2), (-3, 5), (7, 4)\} \subseteq \mathbb{R}^2$  is linearly dependent. Why?
  - ix) Give an example of a matrix which is in row-echelon form.
  - x) Find all eigen values for the matrix A where
    - $\mathbf{A} = \begin{bmatrix} 1 & 3 & 7 & 11 \\ 0 & \frac{1}{2} & 0 & 8 \\ 0 & 0 & 0 & 4 \\ 0 & 0 & 0 & 5 \end{bmatrix}$
- 2. Attempt any two of the following :
  - i) Solve the following system by Gauss-Jordan elimination method.
    - x + 2y 3z = 23x + 4y 5z = 42x + 5y 8z = 5
  - ii) Let  $W_1$  and  $W_2$  be two subspaces of a vector space V. Then prove that  $W_1 \cap W_2$  is a subspace of V.
  - iii) Show that the set  $S = \{(1, 2, 1), (2, 9, 0), (3, 3, 4)\}$  is linearly independent in  $\mathbb{IR}^3$ .
- 3. Attempt any two of the following :
  - i) If B = { (1, 0, 0), (2, 2, 0), (3, 3, 3) } is a basis for IR<sup>3</sup> then find co-ordinate vector and co-ordinate matrix of  $\overline{v} = (2, -1, 3)$  relative to basis B.
  - ii) Verify Cayley-Hamilton theorem for the following matrix.
    - $\begin{bmatrix} -1 & 0 & 1 \\ -1 & 3 & 0 \\ -4 & 13 & -1 \end{bmatrix}$
  - iii) If  $T: V \rightarrow W$  be a linear transformation then prove that ker  $(T) = \{\overline{0}\}$  if and only if T is one-one.

10

- 4. Attempt any one of the following :
  - i) a) Find a basis for the rowspace of

$$\mathbf{A} = \begin{bmatrix} 1 & -2 & 0 & 0 & 3 \\ 2 & -5 & -3 & -2 & 6 \\ 0 & 5 & 15 & 10 & 0 \\ 2 & 6 & 18 & 8 & 6 \end{bmatrix}$$

Hence find rowrank (A).

b) Determine whether the given matrix A is diagonalizable. If so, find a matrix P that diagonalizes A.

Where A = 
$$\begin{bmatrix} 7 & 2 \\ 0 & 8 \end{bmatrix}$$

- ii) a) Let  $T : \mathbb{R}^3 \to \mathbb{R}^2$  be the linear transformation defined by T(x, y, z) = (x + y + z, x y z). Find bases for Kernel of T. Hence find nullity (T) and rank (T).
  - b) For which values of 'a' the following system has no solution.

$$x + 2y + z = 7$$
  

$$x + y - z = 5$$
  

$$x + y + (a2 - 5)z = a$$

B/II/09/8,965

#### S.Y. B.Sc. (Comp. Science) (Semester – I) Examination, 2009 MATHEMATICS (Paper – II) MTC-212 : Numerical Analysis (New Course) (2008 Pattern)

Time : 2 Hours

Instructions : 1) All questions are compulsory.

- 2) Figures to the **right** indicate **full** marks.
- 3) Use of single memory, non-programmable scientific calculator is allowed.
- 1. Attempt **all** questions :
  - i) If y = tanx then find the error in x.
  - ii) Using Newton-Raphson method, obtain the formula to find square root of a number 'K'.
  - iii) Evaluate  $\Delta^2$  (c.d<sup>x</sup>)
  - iv) Write the formula for  $\frac{dy}{dx}$  using Newton's forward interpolation formula.

v) Prove that : 
$$\mu \delta = \frac{1}{2} \left( E - E^{-1} \right)$$

vi) Given  $\frac{dy}{dx} = 1 - y$ ; y(0) = 0, find y(0.1) using Euler's method.

- vii) Find the total number of real roots of the equation  $f(x) = 5x^4 + 3x^2 + 5x 6 = 0$ (Use Descartes rule)
- viii) Define forward and backward difference operator.
- ix) Write Runge-Kutta formula of second order for ordinary differential equation.

x) If 
$$f(1) = 1$$
,  $f(1.25) = 0.8$ ,  $f(1.5) = 0.6666$ , find  $\int_{1}^{10} f(x) dx$  using Trapezoidal rule.

15

- 2. Attempt **any two** of the following :
  - i) Find the root of the equation x.e<sup>x</sup> = 3 using Regula-Falsi method, correct upto two decimal places.
  - ii) Round-off 0.987250 correct to four significant figures and find out absolute, relative and percentage error.
  - iii) Solve the following system of linear equations 10x + 2y + z = 9x + 10y - z = -22

-2x + 3y + 10z = 22

by Gauss Seidel iterative method.

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[3618] – 14

Max. Marks: 40

- 3. Attempt **any two** of the following :
  - i) State and prove Lagrange's interpolation formula for unequally spaced points.
  - ii) From the following table, find  $\frac{dy}{dx}$  and  $\frac{d^2y}{dx^2}$  at x = 0.4.

<b>x</b> :	0.1	0.2	0.3	0.4	0.5
<b>y</b> :	-2.3	-1.6	-1.2	-0.91	-0.69

iii) Given the following data, evaluate f(8) using divided difference formula.

x :	4	5	7	10	11	13
$\mathbf{f}(\mathbf{x}) = \mathbf{y}$ :	48	100	294	900	1210	2028

- 4. Attempt **any one** of the following :
  - i) a) The velocity 'V' of a particle at a distance 'S' from a point on its path is given by the table below :

S(meters) :	0	10	20	30	40	50	60
V(m/Sec.) :	47	58	64	65	61	52	38

Estimate the time taken to travel 60 meters by using Simpson's  $\frac{1}{3}^{rd}$  rule.

b) Evaluate, 
$$I = \int_{4}^{5.2} (1 + \log_{e} x) dx$$
 using Simpson's  $\left(\frac{3}{8}\right)^{\text{th}}$  rule. (Take h = 0.2)

ii) Obtain the formula for Euler's modified method. Also find y(0.02) and y(0.04)

using Euler's modified method, where 
$$\frac{dy}{dx} = x^2 + y$$
;  $y(0) = 1$ . (Take  $h = 0.02$ )

*B/II/09/8,965* 

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## S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2009 ELECTRONICS (Paper – I) ELC 211 :Microprocessor Architecture and Programming (New course) (2008 Pattern)

Time : 2 Hours

Max. Marks: 40

Instructions. : i) All questions are compulsory. ii) Figures to the right indicate full marks. iii) Neat diagrams must be drawn wherever necessary.

- 1. Attempt the following in one or two sentences :
  - a) How many inputs and outputs, the multiplexer should have in general register organization, if seven general registers and one external input is used ?
  - b) Which are the different cache mapping procedures ?
  - c) State any two features of Pentium-4 microprocessor.
  - d) What is the size of EDX register of Pentium Processor ?
  - e) State the two operational modes of Pentium Processor.
  - f) State the addressing mode used in the following instructions :
    - i) MOV AL, 08H
    - ii) ADD CX, [BP]
  - g) What is the difference between instructions MUL source and IMUL source ?
  - h) Which assembler directive is used to assign the beginning address of a program ?
  - i) Which function of DOS interrupt is used to display a string ?
  - j) What is the use of Interrupt Vector Table ?

**P.T.O.** 

 $(1 \times 10 = 10)$ 

- 2. Attempt **any two** of the following :
  - a) Explain data transfer between RAM and I/O's using DMA technique.
  - b) Explain any five of the flags in the flag register of Pentium Processor.
  - c) What are the functions of following assembler directives ?
    - i) Segment
    - ii) DT
    - iii) EQU
    - iv) BYTE PTR
    - v) ENDS
- 3. Attempt **any two** of the following :
  - a) Draw flowchart and write assembly language program to add two 8 bit numbers read from keyboard.
  - b) Draw flowchart and write assembly language program to find largest number from an array of 10 numbers.
  - c) Explain interrupt processing sequence with neat block diagram.
- 4. Attempt **any one** of the following :
  - a) i) Which different segment registers are there in Pentium ? What is the function of segment register in real mode and protected mode operation of Pentium ? If CS = 1000 H and IP = 5000H, find physical address when Pentium works in real mode.
    - ii) Show the format of segment descriptor. How is physical address obtained using segment descriptor ?
  - b) i) What is an interrupt ? Explain Interrupt Vector Table.
    - ii) What is Interface circuit ? Why I/O Interface is there in computer system ?

 $(5 \times 2 = 10)$ 

 $(5 \times 2 = 10)$ 

 $(10 \times 1 = 10)$ 

## S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2009 ELECTRONICS (Paper – I) ELC 211 :Microprocessor Architecture and Programming (New course) (2008 Pattern)

Time : 2 Hours

Max. Marks: 40

Instructions. : i) All questions are compulsory. ii) Figures to the right indicate full marks. iii) Neat diagrams must be drawn wherever necessary.

- 1. Attempt the following in one or two sentences :
  - a) How many inputs and outputs, the multiplexer should have in general register organization, if seven general registers and one external input is used ?
  - b) Which are the different cache mapping procedures ?
  - c) State any two features of Pentium-4 microprocessor.
  - d) What is the size of EDX register of Pentium Processor ?
  - e) State the two operational modes of Pentium Processor.
  - f) State the addressing mode used in the following instructions :
    - i) MOV AL, 08H
    - ii) ADD CX, [BP]
  - g) What is the difference between instructions MUL source and IMUL source ?
  - h) Which assembler directive is used to assign the beginning address of a program ?
  - i) Which function of DOS interrupt is used to display a string ?
  - j) What is the use of Interrupt Vector Table ?

**P.T.O.** 

 $(1 \times 10 = 10)$ 

- 2. Attempt **any two** of the following :
  - a) Explain data transfer between RAM and I/O's using DMA technique.
  - b) Explain any five of the flags in the flag register of Pentium Processor.
  - c) What are the functions of following assembler directives ?
    - i) Segment
    - ii) DT
    - iii) EQU
    - iv) BYTE PTR
    - v) ENDS
- 3. Attempt **any two** of the following :
  - a) Draw flowchart and write assembly language program to add two 8 bit numbers read from keyboard.
  - b) Draw flowchart and write assembly language program to find largest number from an array of 10 numbers.
  - c) Explain interrupt processing sequence with neat block diagram.
- 4. Attempt **any one** of the following :
  - a) i) Which different segment registers are there in Pentium ? What is the function of segment register in real mode and protected mode operation of Pentium ? If CS = 1000 H and IP = 5000H, find physical address when Pentium works in real mode.
    - ii) Show the format of segment descriptor. How is physical address obtained using segment descriptor ?
  - b) i) What is an interrupt ? Explain Interrupt Vector Table.
    - ii) What is Interface circuit ? Why I/O Interface is there in computer system ?

 $(5 \times 2 = 10)$ 

 $(5 \times 2 = 10)$ 

 $(10 \times 1 = 10)$ 

**P.T.O.** 

# S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2009

## ELECTRONICS (Paper – II) ELC – 212 : Communications Principles (New Course) (2008 Pattern)

Time : 2 Hours

Instructions : 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Neat diagrams must be drawn wherever necessary.

- 1. Answer the following in **one** or **two** sentences :
  - a) Define noise in communication system.
    - b) What is Baud Rate ?
- c) What will be the effect on bandwidth if the modulating frequency in AM is increased by 1KHz ?
  - d) Draw the waveform of ASK for the data 11001010.
  - e) In electronic communication, the term CDMA stands for \_\_\_\_\_
    - f) State any two applications of FDM system.
    - g) What is protocol in electronic communication ?
    - h) State the modes given by IEEE 802.11 for a wireless LAN.
      - i) What is a piconet ?
      - j) How many characters can be sent through SMS service ?

 $(1 \times 10 = 10)$ 

[3618] – 16

Max. Marks: 40

#### [3618] – 16

#### 

 $(5 \times 2 = 10)$ 

- 2. Attempt **any two** of the following :
- a) With the help of neat waveforms, explain amplitude, frequency and phase modulation.
- b) What is spread spectrum multiple access ? Explain the concept of frequency hopped multiple access.
  - c) Describe GSM architecture in detail with the help of its block diagram.
    - 3. Attempt **any two** of the following :
      - a) Explain QPSK modulator in detail.
      - b) With a neat diagram, explain TDM system.
    - c) Explain frequency reuse and handoff concept in cellular system.
      - 4. Attempt any one :

 $(10 \times 1 = 10)$ 

 $(5 \times 2 = 10)$ 

- a) i) Describe multidirectional and omnidirectional antenna.
- ii) What is RFID ? Describe the components of RFID technology.
- b) i) What is serial communication ? Differentiate between Asynchronous and Synchronous transmission.
- ii) State Shannon's Theorem. Explain the significance of signal to noise ratio. In a communication system, if the channel bandwidth is 20 KHz and  $\frac{S}{N}$  ratio is 200. Calculate the channel capacity.

B/II/09/8,965

## S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2009 ENGLISH (General) (2008 Pattern)

#### Time : 2 Hours

- 1. Answer **any two** of the following :
  - A) State whether the following situations are formal or informal.
    - i) Friends chatting at a restaurant.
    - ii) Announcement made by an Air-hostess.
    - iii) Lecture session in a classroom.
    - iv) Medical conference.
    - v) Fans cheering a football team in the stadium.
  - B) Identify the message that each of the non-verbal signals convey.
    - i) Shrugging your shoulders.
    - ii) Raising eyebrows.
    - iii) Waving your hand.
    - iv) Covering your ears with your hands.
    - v) Frown.
  - C) Write down points for a brief talk on 'Road Safety'.
- 2. A) Use the following words in sentences to bring out their literal and figurative meanings. (Make two sentences using each word).close, cold, fire.
  - B) Differentiate between the following pairs of words and use them in sentences. 3
    - i) graceful, gracious
    - ii) accent, ascent
    - iii) altar, alter.

[3618] – 17

Marks: 40

10
<ul> <li>C) Choose the correctly spelt word from the following sets of words.</li> <li>i) privilege, priviledge, priveledge</li> <li>ii) weard, weird, wierd</li> <li>iii) belief, bilief, beleif.</li> <li>iv) millennium, milleniam.</li> </ul>
3. A) Write four words each belonging to the following lexical webs.3i) electionii) weatheriii) hygiene.
<ul> <li>B) Re-order the letters to make meaningful words using the hints below.</li> <li>3</li> <li>i) porpnuytoit (chance)</li> <li>ii) iotvcaan (holiday)</li> <li>iii) talaf (dealing with death)</li> </ul>
C) Write the synonyms of the following words.4i) yearlyii) mandatoryiii) triumphantiv) assess
<ul> <li>4. Answer any two of the following : 10</li> <li>A) Write the phonetic transcription for the following words. <ul> <li>i) need</li> <li>ii) map</li> <li>iii) cat</li> <li>iv) pipe</li> <li>v) play.</li> </ul> </li> </ul>
<ul> <li>B) Write appropriate expressions for the following situations.</li> <li>i) greetings and responding.</li> <li>ii) closing a conversation.</li> <li>iii) seeking permission.</li> <li>iv) responding to good news.</li> <li>v) seeing off someone.</li> <li>C) You are applying for a Bank loan. What questions would you ask the Bank</li> </ul>

*B/II/09/8,965* 

## S.Y. B.Sc. (Semester – II) Examination 2009 COMPUTER SCIENCE (Paper – I) CS.221 : Object Oriented Concepts and Programming in C++

Time : 2 Hours

Instructions : 1) All questions are compulsory.

- 2) All questions carry equal marks.
- 3) Assume suitable data if necessary.
- 4) Black figures to the **right** indicate **full** marks.
- 1. Attempt all of the following :
  - a) Define the term early binding.
  - b) What is meant by using reference variable as a argument to function ?
  - c) Give any two formatted I/O function with equivalent manipulators.
  - d) What is return by reference ?
  - e) "Destructor does not take any argument". Justify (T/F).
  - f) Give any two operators which can not be overloaded.
  - g) What is order of execution of constructors ?Class D : Public B1, Virtual B2.
  - h) Differentiate between read ( ) and get ( ) function.
  - i) Define the term class template.
  - j) What is container class ?
- 2. Attempt any two of the following :
  - a) Write a C++ program to accept the itemno, name, qty, rate, for five items using array of objects. Calculate amt, and total bill and display the output.
  - b) Write a C++ program to accept a string and display in triangular format.
     input → a b c

c) Give properties of friend function. Explain when it is compulsory to use friend function.
 P.T.O.

## $(1 \times 10 = 10)$

 $(2 \times 5 = 10)$ 

[3618] – 201

Max. Marks: 40

#### B/II/09/2,445

#### 

 $(2 \times 5 = 10)$ 

 $(1 \times 10 = 10)$ 

3. Attempt **any two** of the following :

[3618] - 201

- a) What is constructor ? Explain with example parameterized and overloaded constructor.
- b) Write a C++ program which having two class members a, b. Overload and ++ operator where will negate whereas ++ will increment the values of a & b. Write necessary functions.
- c) What is inheritance ? Explain multiple and hierarchicals inheritance.
- 4. Attempt **any one** of the following (**A** or **B**) :
  - A) i) Write a C++ program to read a file and convert lowercase character to an uppercase characters.
    - ii) Explain how to overload binary operators with and without using friend function.

#### OR

- B) 1) Write any four error handling function used during file handling.
  - 2) Write a C++ program to store following details :

base : pcode, pname, pstate

derived : innings, runs.

Carry out following methods :

- i) Build a master table
- ii) List all records
- iii) Search according to pcode
- iv) Exit.

## S.Y. B.Sc. (Sem. II) Examination, 2009 **COMPUTER SCIENCE (Paper – II) CS-222 : File Structures and Database Concepts – II**

Time : 2 Hours

**Instructions** : 1) Black figures to the **right** indicate **full** marks. 2) All questions carry equal marks. 3) All questions are compulsory.

- 1. Attempt all of the following :
  - a) What is denormalization?
  - b) Consider following table structure, order (order id, date, cust id)

customer (cust\_id, cust\_name, addr)

Solve the query : Display all such customer names who placed more than 5 orders.

- c) Give any two factors to measure a query cost.
- d) What is reorder level?
- e) Give any two uses of TPS.
- f) Explain referential integrity rule.
- g) What is bottom level in pyramid of MIS in organization?
- h) State the factors which affects recruitment.
- i) What is double entry book keeping system ?
- i) What is lead time?

[3618] - 202

Max. Marks: 40

 $(1 \times 10 = 10)$ 

- 2. Attempt **any two** of the following :
  - a) Course (course\_id, course\_name, duration, fees, intake\_capacity)
    Student (student\_id, stud\_name, marks)
    Faculty (fact\_id, fact\_name, experience, salary)
    Relation between course and student is 1 m
    course and faculty is 1 m student and faculty is 1 m.

Solve following queries :

- 1) Count the number of students for 'JAVA' course.
- 2) Display name of highest ranking student.
- 3) Increase the marks by 10 of those students who are from 'BSC' course and whose name is 'XYZ'.

b) Emp (empno, ename, desig, jdate, salary, commission, deptno)
Dept (deptno, dname, loc)
Solve following queries :

- 1) Display department name in which more than two clerks are working.
- 2) Display employee names whose salary is less than average commission.
- 3) Display all employee names whose job is same as job of 'Mr. SMITH'.
- 4) Display highest salary paid by the organization in each department.
- 5) Display all employee names in the order of their departments.
- c) Consider the relation R = (A, B, C, D, E) and F is  $\{A \rightarrow B, CD \rightarrow E, A \rightarrow C, B \rightarrow D, E \rightarrow A\}$  compute F+.

 $(2 \times 5 = 10)$ 

-2-

 $(2 \times 5 = 10)$ 

- 3. Attempt **any two** :
  - a) Explain selection and recruitment procedure in detail.
  - b) Draw the layout of purchase order and Bincard.
  - c) Journalise the following transactions and prepare the ledger account for the same.
    - May 10 : Cash withdrawn for personnel use Rs. 5000
    - May 15 : Purchased goods for Rs. 1000
    - May 20 : Cash deposited in bank Rs. 7000
    - May 25 : Paid cash to Mr. A Rs. 1500
    - May 30 : Received cash from Mr. B Rs. 1200.
- 4. Attempt the following :

 $(2 \times 5 = 10)$ 

- a) Super market is very large departmental store. It has several departments. Each department has several sales personnel. The other employees are cashiers and managers who do the overall monitoring. Customer buys goods from sales persons who immediately prepares bills and direct customer to one of the cashier. Customer pays bill and after showing paid bill sales staff delivers packets. The sales staff gets commission depending on the number of sales made, while cashier's commission depends on the number of bills processed. All the employees gets fixed salary apart from commission.
  - 1) Draw ER diagram.
  - 2) Convert the ERD into relational database in 3 NF.
- b) Explain goals of CBPIS.

OR

- b) Define following terms :
  - 1) Direct material.
  - 2) Bank reconcilation statement
  - 3) EOQ
  - 4) Trial balance
  - 5) Balance sheet.

[JU ci) (Somostor II) Examination 200

## S.Y. B.Sc. (Comp. Sci.) (Semester – II) Examination, 2009 MATHEMATICS (Paper – I) MTC : 221 : Computational Geometry

Time : 2 Hours

- N.B.: 1) All questions are compulsory.
  - 2) Figures to the **right** indicate **full** marks.
  - *3) Use of single memory non-programmable scientific calculator is allowed.*
- 1. Attempt the following :
  - i) The circle of area 5 cm<sup>2</sup> is scaled uniformly by factor 3, then what is the area of transformed figure ?
  - ii) Define the term : Foreshortening factor.
  - iii) A shadow of a person standing on ground is formed by sunlight. What type of projection is this ?
  - iv) Write the transformation matrix which is required to transform the plane x = 0 to the plane x = 6.
  - v) Write the transformation matrix for the reflection through the line y = -x.
  - vi) Define perspective transformation.
  - vii) Find the angle  $\delta\theta$  to generate 10 equidistant points on an elliptical arc in the

 $1^{\text{st}}$  and  $2^{\text{nd}}$  quadrant for  $\frac{x^4}{4} + \frac{y^2}{25} = 1$ .

viii) Give the name of the transformation represented by the matrix [T].

$$[T] = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & -0.1 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

- ix) Find the concatenated transformation matrix to create the bottom view of an object.
- x) Write any two properties of Be'zier curve.

[3618] – 203

Max. Marks: 40

10

- 2. Attempt **any two** of the following :
  - i) Prove that, if a  $2 \times 2$  transformation matrix is applied on a pair of parallel lines then they are transformed to a pair of parallel lines.
  - ii) If an object [x] is reflected through the plane z = 2, then find the transformed object, where

 $[x] = \begin{bmatrix} 2 & 3 & 4 \\ 4 & -1 & 1 \end{bmatrix}$ , using combined transformation matrix.

iii) If a 2×2 transformation matrix  $[T] = \begin{bmatrix} 1 & 2 \\ 3 & -1 \end{bmatrix}$  is used to transform the line

y = -2x + 2 then find the equation of the resulting line.

- 3. Attempt **any two** of the following :
  - i) Show that the parabola  $x = t^2$ , y = t is transformed to unit circle by the transformation matrix [T].

$$[T] = \begin{bmatrix} 0 & -2 & 2 \\ -2 & 2 & -2 \\ 1 & 0 & 1 \end{bmatrix}.$$

- ii) Write the algorithm for reflection through any arbitrary plane in space.
- iii) Consider the Be'zier curve determined by the control points  $B_0[2 \ 1]$ ,  $B_1[4 \ 3]$ ,  $B_2[6 \ 0.5]$ . Find the first derivative of the curve at t = 0.3.

## 4. Attempt **any one** of the following :

i) Define foreshorting factor.

Find the angles  $\theta$  and  $\phi$  when an isometric projection is formed by the rotation about y-axis through an angle  $\phi$ , followed by the rotation about x-axis through an angle  $\theta$  and then orthographic projection on z = 0 plane. How many isomorphic projections of any object are possible ?

ii) Generate uniformly 8 points on the hyperbolic segment in the first quadrant with a = 2, b = 1 for  $4 \le x \le 8$ .

*B/II/09/1,370* 

## 

10

10

# S.Y. B.Sc. (Comp. Science) (Semester – II) Examination, 2009 MATHEMATICS (Paper – II) MTC – 222 : Operations Research

Time : 2 Hours

Instructions :1) All questions are compulsory.

- 2) Figures to the **right** indicate **full** marks.
- *3)* Use of single memory, non-programmable scientific calculator is **allowed**.

## 1. Attempt all questions :

- i) Write the following LPP in standard form Max (z) = x + 2ySubject to  $3x + 2y \ge 1$   $x - y \le 3$  $x, y \ge 0$ .
- ii) Define degenerate solution in transportation problem.
- iii) Find dual of the following LPP :

Max (z) =  $x_1 - x_2 + 3x_3$ Subject to  $x_1 + x_2 + x_3 \le 10$  $2x_1 - x_3 \le 2$  $2x_1 - 2x_2 + 3x_3 \le 6$  $x_1, x_2, x_3 \ge 0$ 

iv) State **true** or **false** :

'A game is said to be strictly determinable if the value of the game is non-zero.'

v) Find the saddle point of the following game :

	B <sub>1</sub>	$\mathbf{B}_{2}$	B <sub>3</sub>	$\mathbf{B}_{4}$
$\mathbf{A}_{1}$	[-5]	$2^{-}$	0	7
$\mathbf{A}_{2}$	5	6	4	8
A <sub>3</sub>	4	0	2	-3

Max. Marks: 40

[3618] - 204

## 

-2-

- vi) Define slack variable.
- vii) Solve the following assignment problem.

	$\mathbf{M}_{1}$	$M_2$	$M_3$
$\mathbf{J}_1$	5	7	11
$\mathbf{J}_2$	8	0	3
<b>J</b> <sub>3</sub>	4	10	1

- viii) Define two person zero sum game.
- ix) Use North West Corner rule to find IBFS of the following transportation problem.



- x) Is the following assignment problem balanced ?
  - $\begin{bmatrix} 1 & 2 & 5 \\ 3 & 9 & 8 \end{bmatrix}$
- 2. Attempt **any two** of the following :
  - i) Solve the following LPP by graphical method.

Maximize  $Z = 6x_1 + 4x_2$ 

Subject to

$$\begin{aligned} -2x_1 + x_2 &\leq 2 \\ x_1 - x_2 &\leq 2 \\ 3x_1 + 2x_2 &\leq 9 \\ x_1, x_2 &\geq 0. \end{aligned}$$

3/4 1/4

 $1/_{2}$ 

## 

-3-

- ii) Explain Matrix Minima method for obtaining an initial basic feasible solution of a transportation problem.
- iii) Using the principle of dominance, solve the following game :

- 3. Attempt **any two** of the following :
  - i) Use Simplex method to solve the given LPP

Maximize  $Z = x_1 + x_2 + x_3$ Subject to  $3x_1 + 2x_2 + x_3 \le 3$  $2x_1 + x_2 + 2x_3 \le 2$  $x_1, x_2, x_3 \le 0$ 

ii) Solve the following assignment problem :

		Ι	II	Ш	IV
	A	8	26	17	11
Machines	В	13	28	4	26
	С	38	19	18	15
	D	19	26	24	10

Jobs

- -4-
- iii) Solve the following  $2 \times 3$  game graphically

Player BPlayer A
$$\begin{bmatrix} 1 & 3 & 11 \\ 8 & 5 & 2 \end{bmatrix}$$

- 4. Attempt **any one** of the following :
  - i) The owner of a small machine shop has four mechanics available to assign jobs for the day. Five jobs are offered with expected profit for each mechanic on each job which are as follows :

			Job					
		Α	B	С	D	Ε		
Mechanic	1	62	78	50	111	82		
	2	71	84	61	73	59		
	3	87	92	111	71	81		
	4	48	64	87	77	80		

Find the assignment schedule that will result in a maximum profit.

ii) Find IBFS of the following transportation problem by VAM. Hence obtain optimal solution by MODI method.

	D <sub>1</sub>	<b>D</b> <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	Supply
0,	2	2	2	1	. 3
<b>O</b> <sub>2</sub>	10	8	5	4	. 7
0,	7	6	6	8	5
Demand	4	3	4	4	15

*B/II/09/1,055* 

## S.Y. B.Sc. (Comp. Sc.) (Semester – II) Examination, 2009 ELC 221 – ELECTRONICS (Paper – I) Microprocessors

Time: 2 Hours

*Instructions* : 1) *All* questions are compulsory.

- 2) Figures to the **right** indicate **full** marks.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Instruction set of Pentium Microprocessor is **provided** on the last page.
- 1. Answer the following :
  - a) Which microprocessor is known as the World's first microprocessor developed by Intel Corporation ?
  - b) What is the difference between the CX and CH register in pentium ?
  - c) Write the function of assembler directive 1) DW and 2) EQU.
  - d) What is the need of 'Prefetch buffer' in the pentium architecture ?
  - e) Differentiate between MOV BX, SI and MOV BX, [SI].
  - f) What are the contents of CS : IP for INTO (type-4) interrupt ?
  - g) Write any two tasks performed by operating system.
  - h) Calculate the physical address of the last location of the data segment, if it begins at 20000H.
  - i) In which multiprocessor system faulty processor can not affect the operation of whole system ?
  - j) Classify the following instructions
    - i) STD
    - ii) SHL Destination, count.

Р.Т.О.

# [3618] - 205

Max. Marks: 40

 $(1 \times 10 = 10)$ 

- 2. Attempt **any two** of the following :
  - a) Differentiate between 8086 microprocessor and 80486 microprocessor with respect to: i) Address bus ii) Data bus iii) Clock frequency iv) Maximum addressable memory v) Cache.
  - b) What is addressing mode ? Explain with suitable example any four modes of addressing.
  - c) What is assembler? Compare assembly language with machine language.
- 3. Attempt **any two** of the following :
  - a) Explain any five flags in the lower word of flag register of pentium microprocessor.
  - b) Write an assembly language program to find largest and smallest number from an array [5H, 02H, B5H, A2H, 10H].
  - c) How is the execution of a program carried out in closely coupled multiprocessor system ?
- 4. Attempt **any one** of the following :
  - a) i) Explain with neat block diagram the interrupt processing sequence.
    - ii) How does the multiple hardware interrupts are handled using priority encoder?
  - b) i) What will be the content of AX register after execution of the following instructions.
    - 1) MOVAX. BX
    - 2) IN AX, 80H
    - 3) XCHGAX, DX
    - 4) ADC AX, BX
    - 5) XOR AX, CX
    - ii) What are the features of Pentium microprocessor in real mode and in protected mode operation ?

 $(2 \times 5 = 10)$ 

 $(1 \times 10 = 10)$ 

-2-

 $(2 \times 5 = 10)$ 

## **INSTRUCTION SET OF PENTIUM MICROPROCESSOR**

AAA	AAD	AAM	AAS	ADC	AND
ARPL	BOUND	BSF	BSR	BSWAP	BT
BTC	BTR	BTS	CALL	CBW	CDQ
CLC	CLD	CLI	CLTS	CMC	CMP
CMPS	CMPXCHG	CMPXCHG 8B	CPUID	CWD	CWDE
DAA	DAS	DEC	DIV	ENTER	HLT
IDIV	IMUL	IN	INC	INS	INT
INTO	INVD	INVLPG	IRET	IRETD	JC/JNC
	JCXZ	JECXZ	JMP	JZ/JNZ	LAHF
LAR	LDS	LEA	LEAVE	LES	LFS
LGDT	LGS	LIDT	LLDT	LMSW	LOCK
LODS	LOOP	LOOPZ	LOOPNZ	LSL	LSS
LTR	MOV	MOVS	MOVSX	MOVZX	MUL
NEG	NOP	NOT	OR	OUT	OUTS
POP	POPA	POPA D	POPF	POPFD	PUSHA
PUSHA D	PUSH	PUSHD	PUSH F	PUSHFD	PUSHW
RCL	RCR	RDTSC	RET	ROL	ROR
SAHF	SAR	SBB	SCAS	SET	SGDT
SHL/SAL	SHLD	SHR	SHRD	SIDT	SLDT
SMSW	STC	STD	STI	STOS	STR
SUB	TEST	VERR	VERW	WBINVD	XADD
XCHG	XL.AT	XOR			

## S.Y. B.Sc. (Comp. Sc.) (Sem. – II) Examination, 2009 ELECTRONICS (Paper – II) ELC 222 : Communication Principles

Time : 2 Hours

Instructions : 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Neat diagrams must be drawn wherever necessary.

- 1. Answer the following in **one** or **tw**o lines :
  - a) Define frequency modulation.
  - b) State Nyquist theorem.
  - c) What is half duplex communication system ? Give one example.
  - d) Give two reasons for using modulation techniques in communication system.
  - e) Calculate modulation index for amplitude modulation, if the amplitude of modulating signal is 3 V and that of the carrier signal is 6 V.
  - f) State two types of TDM.
  - g) What is the role of hybrid in subscriber end instrument ?
  - h) What do you mean by plaintext and ciphertext ?
  - i) Write the expression for Shannon channel capacity.
  - j) What is full form of QPSK ?
- 2. Attempt **any two** of the following :
  - a) What is CODEC ? With the help of block diagram explain receive block of CODEC.
  - b) What is public key encryption ? How it can be used to implement digital signature ?
  - c) Explain the working of QPSK modulator.

 $(5 \times 2 = 10)$ 

# [3618] - 206

Max. Marks: 40

(1×10=10)

- 3. Attempt **any two** of the following :
  - a) Draw the circuit diagram of amplitude demodulator using diode and explain its working.
  - b) Explain in brief the two types of dialing techniques.
  - c) Differentiate between optical fibre cable and co-axial cable used as transmission media.
- 4. Attempt **any one** of the following :
  - a) i) Write working principle of ASK and PSK. Draw output waveform for the data 11100110.
    - ii) What is delta modulation? Draw block diagram and explain delta modulation.
  - b) i) Draw block diagram and explain common control system.
    - ii) Explain the steps carried out to transmit the document from one fax machine to another.

*B/II/09/1,775* 

#### 

 $(10 \times 1 = 10)$ 

 $(5 \times 2 = 10)$ 

## S.Y. B.Sc. (Sem. – II) Examination, 2009 **Computer Science ENGLISH** (General)

Time: 2 Hours

## Max. Marks: 40

## All questions are compulsory.

1. a) Write a letter to the Mayor of your city complaining about the wastage of electricity as the street lights remain on regularly during the daytime in your locality. 5 b) Send an e-mail to your boss explaining him your inability to attend the office for a week and the delay in completing your project. 5 2. a) The Management of 'Tata Motors' proposes to launch a new small car in the market. Write a report as the Secretary to the G.M. regarding the customer responses. 5 b) Write a set of instructions on how to open an E-mail account. 5 3. a) Develop a paragraph on the basis of the Pie-Diagram given below. 5

Students opting for various courses today.



1989	Engineering	
	Bio-technology	
	BBA	
2000	Arts	
	Commerce	
	computer Science	
	Basic sciences.	

- b) You are the Secretary of the Sports Association of your college. Prepare a Notice to call a Meeting of the Association in order to plan the 'Annual Sports' Day'.
- 4. a) Prepare an advertisement on 'Nirmal Gram Abhiyan' a cleanliness awareness campaign for the villagers. 5 5
  - b) Write the process of getting a driving license for a two-wheeler.

B/II/09/810

5

# [3618] - 207

# T.Y. B.Sc. (Semester–III) Examination, 2009 COMPUTER SCIENCE (Paper–I) CS–331 : System Programming – I

## Time : 2 Hours

- 1. Attempt **all** of the following :
  - a) List the advantages of dynamic memory allocation.
  - b) What is a system program ?
  - c) Define linking.
  - d) State the names of data structures of assembler during translation.
  - e) What is translated origin?
  - f) Give schematic of optimizing compiler.
  - g) State the term forward reference.
  - h) Define macro.
  - i) List the names of model editors.
  - j) What are different kinds of assembly language statement?
- 2. Attempt **any two** of the following :
  - a) Write an assembly language program to print first 100 natural nos.
  - b) Differentiate between compiler and interpreter.
  - c) What is absolute loader? State its advantages and disadvantages.

 $(2 \times 5 = 10)$ 

# [3618] - 301

Max. Marks : 40

 $(10 \times 1 = 10)$ 

- 3. Attempt **any two** of the following :
  - a) Find out the contents of SYMTAB, literal table, pool table and generate intermediate code for variant–I.

READ N MOVER AREG = '1' MOVEM AREG, CONT C EQU CONT AGAIN MOVER AREG, C MULT AREG, N MOVEM AREG, T PRINT T MOVEM AREG, C ADD AREG, = '1' MOVEM AREG, CONT TABLE EQU T COMP AREG, = '10'

BC LE, AGAIN

STOP

CONT DS 1

- N DS 1
- T DS 1

**END** 

.....



 $(2 \times 5 = 10)$ 

- b) Explain what is expansion time variables in macro.
- c) Construct triple and indirect triple for following string :
  - $z:=a\!\uparrow\!b\!\uparrow\!c+d\,\ast\,m\!/\!f-w$

$$y := z + d * m.$$

4. Attempt **any one** of the following (**A** or **B**) :

 $(1 \times 10 = 10)$ 

- A) i) What is P-code compilers ? What are its advantages ?
  - ii) What are the drawbacks to topdown parser with the backtrack?
- B) i) Explain the concept of activation record. How activation record is created for recursion ?
  - ii) What is an ambiguous grammar ? How ambiguity can be removed from the grammar ? Explain with example.

B/II/09/7,280

# T.Y. B.Sc. (Semester – III) Examination, 2009 COMPUTER SCIENCE (Paper – II)

## CS-332 : Theoretical Computer Science and Compiler Construction – I

Time : 2 Hours

Instructions : 1) Black figures to the right indicate full marks. 2) All questions carry equal marks. 3) All questions are compulsory.

- 1. Attempt all of the following :
  - a) Let  $X = \{a, b, c\} \& Y = \{e, f, g\}$  then write cartesion product of X & Y.
  - b) Explain right linear grammar with example.
  - c) Define  $\in$  closure of a state of FA.
  - d) FA have only one start state. State True or False.
  - e) Construct DFA for language  $L = \{a (a + b)^*\}.$
  - f) What will be the smallest possible string generated by  $RE = (ab^*)^*$ ?
  - g) Every regular language is CFL. State True or False.
  - h) What is a unit production in grammar?
  - i) How  $\delta$  function is mapped in PDA ?
  - j) What is the difference between PDA & FA?
- 2. Attempt **any two** of the following :
  - a) Construct DFA to accept binary no. whose decimal equivalent is divisible by 5.
  - b) Construct DFA equivalent to given NFA with  $\in$  move.



c) Construct NFA for the following RE  $(1(01)^*) + (0(01)^*1)$ .

Max. Marks: 40

 $(1 \times 10 = 10)$ 

[3618] - 302

 $(2 \times 5 = 10)$ 

- 3. Attempt **any two** of the following :
  - a) Find CFG which generate set of odd length string in {0, 1} whose 1<sup>st</sup>, middle, and last symbol are same.
  - b) Construct PDA over  $\{0, 1\}$  to accept a string which does not contain the substring "00".
  - c) Convert the following grammar to GNF

 $S \rightarrow AA \mid 0$  $A \rightarrow SS \mid 1$ 

- 4. Attempt **any two** of the following :
  - a) Find minimal DFA for the following FA

 $\mathbf{M} = (\{q_0, q_1, q_2, q_3, q_4, q_5, q_6\}, \{0, 1\}, \delta, q_0, q_5)$ 

where  $\delta$  is

δ	0	1
q <sub>0</sub>	$\mathbf{q}_1$	$q_2$
$q_1$	$q_3$	$\mathbf{q}_4$
$q_2$	$q_5$	$q_6$
<b>q</b> <sub>3</sub>	$q_3$	$\mathbf{q}_4$
$q_4$	$q_5$	$q_6$
<b>q</b> <sub>5</sub>	$q_3$	$\mathbf{q}_4$
$q_6$	$q_5$	$q_6$

 $(2 \times 5 = 10)$ 

(2×5=10)

-3-

b) Construct PDA for the following CFG.

 $S \rightarrow aAb \mid aS$  $A \rightarrow Bb \mid a$  $B \rightarrow Sa \mid b$ 

c) i) Rewrite the grammar after removing the  $\in$  production.

 $S \rightarrow aSa \mid bSb \models$  $A \rightarrow aBb \mid bBa$  $B \rightarrow aB \mid bB \models$ 

ii) Convert following grammar to CNF.

 $S \rightarrow aSd \mid aAd$  $A \rightarrow bAc \mid bc$ 

*B/II/09/7,305* 

# T.Y. B.Sc. (Semester–III) Examination, 2009 COMPUTER SCIENCE (Paper–III) CS–333 : Computer Networks and Network Administration – I

Time : 2 Hours

- *N.B.*: 1) All questions are compulsory.
  2) Figures to the right indicate full marks.
- 1. Attempt **all** of the following :
  - a) What are advantages of multipoint connection over point to point ?
  - b) Which of the OSI layers handles each of the following ?
    - i) Dividing the transmitted bit stream into frames.
    - ii) Determining which route through the subnet to use.
  - c) By using byte stuffing stuff the data.
    - A ESC Flag B
  - d) How does a VLAN reduce network traffic ?
  - e) Why there is no need for CSMA/CD on a full duplex ethernet LAN ?
  - f) What is use of information frame of HDLC?
  - g) Define multiplexing and demultiplexing.
  - h) State pipelining.
  - i) What is the purpose of the jam signal is CSMA/CD?
  - j) List the physical and logical topologies used in LAN.

**P.T.O.** 

Max. Marks : 40

[3618] - 303

 $(10 \times 1 = 10)$ 

2. Attempt **any two** of the following :

- a) Explain the concept of ALOHA with its types.
  b) State and explain the design issues of layers.
  c) What are the services of datalink layer provided to network layer ?
  3. Attempt any two of the following : (2×5=10)

  a) What is controlled access method ? Explain reservation method in detail.
  b) Explain NRZ encoding. Draw RZ encoding for 01001110 bit pattern.
  c) Discuss a simplex protocol for noisy channel.

  4. Attempt any one of the following (I or II) : (1×10=10)

  I) a) Explain 1-persistent and non persistent CSMA.

  - b) Draw and explain the frame format of PPP with its features.
  - II) a) What is Piggybacking ? Discuss selective repeat protocol of sliding window.
    - b) Explain the factors affecting protocol efficiency.

*B/II/09/7,305* 

## 

 $(2 \times 5 = 10)$ 

# T.Y. B.Sc. (Sem. – III) Examination, 2009 COMPUTER SCIENCE (Paper – IV) CS -334 : Server Databases and Application Development – I

#### Time : 2 Hours

Instructions : 1) All questions are compulsory.

- 2) Black Figures to the **right** indicate **full** marks.
- 3) Neat diagrams must be drawn wherever necessary.

#### 1. Attempt all of the following :

- a) State the purpose of OLD bind variable in trigger.
- b) What is precedence graph?
- c) State the usage of EXECUTE statement.
- d) Define Recoverable schedule.
- e) What is use of cycle in sequence ?
- f) Define Access matrix.
- g) What is system log ?
- h) What are different types of failures ?
- i) Define client process.
- j) What is inconsistent state of transaction?
- 2. Attempt **any two** of the following :
  - a) PL/PgSQL is bridge the gap between Database Technology and procedure programming language Comment.
  - b) What is 2PL ? Explain variations of 2PL.
  - c) Explain role of DBA with respect to security.

## [3618] - 304

 $(10 \times 1 = 10)$ 

 $(2 \times 5 = 10)$ 

Max. Marks: 40

a) Explain ACID properties of transaction.

b) Consider the following transaction.

T <sub>1</sub> :	Read (X)	$T_2$ : Read (X)	$T_3$ : Read (Y)
	Read (X)	Read (Z)	Y = Y + 10
	Y = Y + X	X = X + 50	Write (Y)
	Write (Y)	Write (X)	Read (X)
		Z = Z + 100	Read (Z)
			X = X + Z
		Write (Z)	Write (X)

Give at least two non-serial schedules that are serializable to serial schedule  $< T_1, T_2, T_3>$ .

c) Consider the following are the log entries at the time of system crash.

```
[Start _Transaction, T_7]
[Write_item, T_7, X, 50]
[Commit T_7]
[Start_ Transaction, T_8]
[Write_item, T_8, Y, 200]
[Write_item, T_8, Z, 300]
[Commit T_8]
[Check-point]
[Start_Transaction, T_9]
[Write_item, T_9, Y, 400]
[Start_Transaction, T_{10}]
[Write_item, T_{10}, Z, 200]
system crash
```

If deferred update with check pointing is used, what will be the recovery procedure ?

 $(2 \times 5 = 10)$ 

-2-

3⁄4 1/4

## 

- 4. Attempt **any tw**o of the following :
  - a) Consider the following relations.

Customer (Cust\_no, name, address, city)

Account (Acc\_no, Acc\_type, balance)

Cust\_Acc (Cust\_no, Acc\_no, W\_date, W\_amount)

Write a trigger that will take care of the constraint customer account balance should be greater than 1000 on withdraws the amount.

-3-

- b) Explain interaction between the client, server and middleware components.
- c) Write note on commit point and check point.

B/II/09/7,305

[3618] - 304

 $(2 \times 5 = 10)$ 

 $1/_{2}$ 

## T.Y. B.Sc. (Sem. – III) Examination, 2009 COMPUTER SCIENCE (Paper – V) CS – 335 : Programming in Java – I

Time : 2 Hours

N.B.: 1) Figures to the right indicate full marks.
2) All questions carry equal marks.
3) All questions are compulsory.

- 1. Attempt **all** of the following :
  - a) What is JVM ?
  - b) Why is it illegal for a static method to invoke a nonstatic method ?
  - c) Why is an Object [] array called a universal array?
  - d) What is the purpose of keyword super ?
  - e) Which class is at the top of exception hierarchy?
  - f) Which containers use a flowlayout as their default layout ?
  - g) Does garbage collector guarantee that a program will not run out of memory?
  - h) State the difference between Input stream class and Reader class.
  - i) How do applets differ from application program ?
  - j) What is the difference between a menuitem and a checkbox menuitem ?
- 2. Attempt **any two** of the following :
  - a) State the significance of the following :i) staticii) finalizeiii) final
  - b) What is package ? What is the importance of using user defined packages in Java ?
  - c) What is an adaptor class ? Give suitable example of implementing Window Listener.

**P.T.O.** 

# [3618] - 305

Max. Marks: 40

 $(1 \times 10 = 10)$ 

 $(2 \times 5 = 10)$ 

- 3. Attempt **any two** of the following :
  - a) Explain how multiple inheritance can be achieved in Java.
  - b) Write a Java program that define an exception called "NoMatch Exception" that is thrown when a string is not equal to "India".
  - c) Write statements to create data streams for the following operations :
    - i) Reading primitive data from a file.
    - ii) Writing primitive data to a file.
    - iii) Reading bytes from a file.
    - iv) Writing bytes to the file.
    - v) Buffering the input.
- 4. Attempt **any two** of the following :
  - a) Write an interactive program in Java using applet which input two numbers in different text boxes and sum of two number is display by giving an appropriate label.
  - b) Write a Java program which shows the combo box contains three entries (C, C++ and Java), the selected entry is displayed in a texbox.
  - c) Write a Java program to create a frame which can be closed and use for drawing line. Handle mouse pressed to drag a line. Also display coordinates of points.

*B/II/09/7,305* 

## 

 $(2 \times 5 = 10)$ 

 $(2 \times 5 = 10)$ 

# T.Y. B.Sc. (Semester–III) Examination, 2009 COMPUTER SCIENCE (Paper–VI) CS–336 : Software Engineering – I

Time : 2 Hours

- N.B. : 1) All questions are compulsory.
  - 2) Figures to the **right** indicate **full** marks.
  - 3) Draw neat diagram wherever necessary.
- 1. Attempt **all** of the following :
  - a) Define coupling.
  - b) State any two characteristics of software.
  - c) Explain Technical Feasibility Study.
  - d) What does the radius of the spiral indicate in the spiral model?
  - e) What do you mean by afferent module ?
  - f) State design principle followed in the output design.
  - g) What is data dictionary ?
  - h) Explain Requirement Investigation.
  - i) Explain purpose of SRS.
  - j) Define Software Engineering.

#### 2. Attempt any two :

- a) What do you mean by Prototype ? Explain in details steps of prototype.
- b) Write a short notes on FACT finding techniques.
- c) What is structured chart? Explain the advantages of structured design.

 $(2 \times 5 = 10)$ 

# $(10 \times 1 = 10)$

# [3618] - 306

Max. Marks: 40

#### 3. Attempt any two :

- a) "Data flow diagram and Data dictionary complement one another" Comment.
- b) Explain the Role of System Analyst.
- c) "NEW COLLEGE OF ENGINEERING" felicitates the fourth year students in the annual social gathering for their various achievements. If a student is the "Best artist", he will get an award of Rs. 500/-. If a student is the "Best Sportsman", he will get an award of Rs. 750/-. If a student is the "Best Scholar", he will get an award of Rs. 1000/-. If a student is the "Best Outgoing Student", he will get an award of Rs. 2,000/-. A "Best Outgoing Student" is one who has received at least two of the above awards and has been honoured by Scholarship by any non-government Institution. Draw a decision table.
- 4. Attempt the following :
  - a) Glen Pharmaceuticals Ltd., distribute a range of products in 11 regions spread over 11 States in India. The regions are further subdivided into 3-4 Zones each. Each Zone has between 10 and 30 sales representative. The Company's product range include 30 different items for each item, sales-representative wise targets for quantity to be sold each month are established. The target are set at the beginning of the quarter. The actual sales made by each of the sales representative are built up from invoices which along with other information carries unique sales representative number. The company desire to have an information system to monitor sales performance of the representatives with respect to targets and productwise sales, similar performance reports for the zones, for the regions and for the company as a whole are also required. Analyse the problem from the specification mentioned above :
    - 1) Identify all entities.
    - 2) Draw a context level DFD.
  - 3) Draw a first level DFD.
    5) Write a short notes on McCall's quality factors.
    3) OR
  - b) Explain 4 GL approach.

B/II/09/7.305

# T.Y.B.Sc. (Semester – IV) Examination, 2009 COMPUTER SCIENCE (Paper – I) CS - 341 : System Programming – II

Time : 2 Hours

- N.B. : 1) All questions are compulsory.
  - 2) All questions carry equal marks.
  - 3) Figures to the **right** indicates **full** marks.
  - 4) Write readable answers.
- 1. Attempt all of the following :
  - a) Define the term System Call.
  - b) List any four Device Management System calls.
  - c) What is CPU-Bound process ?
  - d) "Every process has equal number of CPU-Burst and I/O-Burst" Yes/No. Comment.
  - e) Define the term 'Response Time'.
  - f) What is 'Belady's Anomaly'?
  - g) What is polling ?
  - h) "Round Robin scheduling can be preemptive or non-preemptive" Yes/No ? Justify.
  - i) What is 'Hit ratio' ?
  - j) List various file accessing methods.
- 2. Attempt **any two** of the following :
  - a) What is Page fault ? List the sequence of actions performed to handle the page fault.

**P.T.O.** 

 $(2 \times 5 = 10)$ 

[3618] - 401

Max. Marks: 40

 $(1 \times 10 = 10)$ 

b) Consider following snapshot of a system.

<b>Process</b>	<b><u>CPU-Burst</u></b>	<u>Arrival Time</u>
$P_1$	8	0
P <sub>2</sub>	4	1
P <sub>3</sub>	9	2
P <sub>4</sub>	5	3

Find average turn around time and average waiting time according to

- i) Preemptive SJF ii) FCFS
- c) What is deadlock ? Explain four necessary conditions for the occurance of deadlock.
- 3. Attempt **any two** of the following :

 $(2 \times 5 = 10)$ 

a) Consider following snapshot of a system

Process	A	Allocation				Max				Available			
	Α	B	С	D	А	B	С	D	Α	B	С	D	
$\mathbf{P}_{0}$	0	0	1	2	0	0	1	2	1	5	2	0	
$\mathbf{P}_{1}$	1	0	0	0	1	7	5	0					
$P_2$	1	3	5	4	2	3	5	6					
P <sub>3</sub>	0	6	3	2	0	6	5	2					
$P_4$	0	0	1	4	0	6	5	6					

Answer the following questions using Banker's Algorithm.

- a) What is the contents of matrix Need ?
- b) Is the system in a safe state ?
- c) If a request from process P<sub>1</sub> arrives as (0, 5, 2, 0). Can this request be granted immediately?

 $(1 \times 10 = 10)$ 

b) Consider the physical memory of 15 frames with each frame of size 8 Bytes. Consider page Table entries as



Map following logical addresses to their physical addresses :

- i) 5 ii) 40 iii) 23 iv) 36 v) 68
- c) What is critical section problem ? Give 3 conditions, the solution to critical section problem must satisfy.
- 4. Attempt **any one** of the following (**A** or **B**) :
  - A) All subquestions carries 2 marks.
    - i) List various states of process. Explain their meaning.
    - ii) What is logical and physical address space ?
    - iii) What is dispatcher ? When it is called ?
    - iv) Define TLB.
    - v) Explain long-term schedular.
  - B) i) Find the number of page faults for following reference string according to 4
    - i) LRU
      ii) OPT
      Ref. String : 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 consider 3 page frames.
    - ii) How protection Bits can be used to provide various types of protections in paging ?
    - iii) Define 'operating system'. What are the ways to provide operating system services to user/user program ?

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B/II/09/585
#### Р.Т.О.

# T.Y. B.Sc. (Semester – IV) Examination, 2009 COMPUTER SCIENCE

# **CS-342 : Theoretical Computer Science and Compiler Construction – II**

## Time : 2 Hours

*Instructions* : 1) *Black figures to the right indicate full marks.* 2) *All questions carry equal marks.* 

- 3) All questions are compulsory.
- 1. Attempt **all** of the following :
  - a) Explain the basic model of a turing machine.
  - b) Define lexeme.
  - c) Define l-value and r-value.
  - d) Explain the structure of a lex program.
  - e) What are the viable prefixes ?
  - f) What is left recursive grammar?
  - g) Explain the function goto (y, x).
  - h) How Yacc resolves the parsing action conflicts ?
  - i) What is the use of a bootstrapping ?
  - j) Explain the advantage of a lexical analyze generator.
- 2. Attempt **any two** of the following :
  - a) Design a turing machine that accepts the language  $L = \{0^a \ 1^b \ 2^{a+b} | a, b \ge 1\}$ .
  - b) Prove that CFLs are not closed under intersection.
  - c) Consider the following grammar :
    - $S \rightarrow aAab \mid Aba$
    - $A \mathop{\rightarrow} aS \,|\, bB$
    - $B \mathop{\rightarrow} ASB \,|\, a$

Parse the string "bbababaaba" using shift-reduce parser. Show the input, stack contents and action taken.

[3618] - 402

Max. Marks: 40

10

10

3. Attempt **any two** of the following : a) Check whether the following grammar is SLR (1) or not  $S \rightarrow iSeS | iS | a$ b) Consider the following grammar :  $S \rightarrow Aa \mid bAc \mid dc \mid bda$  $A \rightarrow d$ Check whether this grammar is LALR (1) or not. c) Check whether the given grammar is LL (1) or not.  $S \rightarrow abAB | Abc$  $A \rightarrow Ba \mid \in$  $B \rightarrow bA | Aa | \in$ 4. a) Generate operator precedence relations for the following grammar.  $E \rightarrow E + E | E - E | E * E | E / E | E \uparrow E | (E) | id$ i)  $\uparrow$  is of highest precedence and right associative. ii) \* and / are of next highest precedence and left associative. iii) + and – are of lowest precedence and left-associative. iv) Blanks denote error entries. Try the table on the input  $(id \uparrow id) | id * id$ b) Discuss the issues in lexical analysis. OR b) Discuss the different rules to compute FIRST(X) & FOLLOW(X) with example.

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*B/II/09/855* 

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# T.Y. B.Sc. (Semester – IV) Examination, 2009 COMPUTER SCIENCE CS – 343 : Computer Networks and Network Administration – II

Time : 2 Hours

- N.B. : 1) All questions are compulsory.
  - 2) Figures to the **right** indicate **full** marks.
  - 3) Draw neat and well labelled diagram wherever necessary.
- 1. Answer the following :
  - a) Define domain.
  - b) What is denial of service ?
  - c) Which transmission modes does FTP supports ?
  - d) "Repeaters are amplifiers". Justify.
  - e) What is the use of time to live field in IP datagram?
  - f) Write any two issues by which network differs.
  - g) Define group account.
  - h) What is virus shield ?
  - i) What are the contents of HTTP request message ?
  - j) What are the services of user agent ?
- 2. Attempt **any two** of the following :
  - a) What is network administration ? Explain different resources managed by network administrator.
  - b) What is congestion ? Explain closed loop solution for congestion control.
  - c) Explain different backup types and strategies used by administrator.

(1×10=10)

 $(2 \times 5 = 10)$ 

[3618] - 403

Max. Marks: 40

- 3. Attempt **any two** of the following :
  - a) How address resolution problem and inter networking issues are going to affect network performance ?
  - b) What are different types of bridges ? Explain any one in detail.
  - c) Draw and explain frame format of ARP.
- 4. Attempt **any one** (**I** or **II**) :
  - I) a) Explain the task performed by network layer.
    - b) Explain how communication occurs over control and data connection of FTP.
  - II) a) Explain working of router.
    - b) Write a short note on :
      - i) UDP
      - ii) Ping.

B/II/09/960

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# T.Y. B.Sc. (Computer Science) (Semester – IV) Examination, 2009 (Paper–IV) CS 344 : SERVER DATABASES AND APPLICATION DEVELOPMENT – II

Time : 2 Hours

Instructions : 1) Neat diagrams must be drawn wherever necessary
2) Black figures to the right indicate full marks.
3) All questions are compulsory.

- 1. Attempt all of the following :
  - a) List any four web server names.
  - b) Write any four conditions which return false boolean value.
  - c) State the difference between extract ( ) and compact ( ) function.
  - d) State the purpose of array\_walk ( ) function.
  - e) What is drawback of print\_r () function ?
  - f) echo statement is a language construct comment.
  - g) How to return multiple values in function?
  - h) What is introspection ?
  - i) Write the purpose of SESSION\_START ( ) function.
  - j) What is file upload ?
- 2. Attempt **any two** of the following :
  - a) Explain any five function to search an element from an array.
  - b) Explain any four strings compare function in PHP.
  - c) What is variable parameter function? Explain variable parameter function with suitable example.

 $(10 \times 1 = 10)$ 

# [3618] - 404

Max. Marks: 40

- 3. Attempt **any two** of the following :
  - a) Write a php script to display number of times the web pages is visited.
  - b) Write a php script. Given a flat file of student information seat no, name and marks of Physics, Chem., Math., read this file and print the mark list in tabular form. Marklist will contain seat-no, name, marks of subject, total marks and percentage.
  - c) Explain the concept of constructor in php with suitable example.
- 4. Attempt **any two** of the following :
  - a) Consider the following relational database
    Item (item\_no, item\_name, price)
    Supplier (Sup\_no, Sup\_name, City, Ph\_no.)
    Item\_Sup (item\_no, Sup\_no, Quantity)
    Write php script display Sup\_name, item\_name and total quantity supplied by supplier in tabular format.
  - b) Write note on self processing form with suitable example.
  - c) Write a php script to create file strcat.abc which contains function concat (), to concatenation two string. Call the same function in strcat.php.

B/II/09/630

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 $(2 \times 5 = 10)$ 

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# T.Y. B.Sc. (Sem. – IV) Examination, 2009 COMPUTER SCIENCE CS – 345 : Programming in Advanced Java – II

Time : 2 Hours

Instructions : 1) All questions carry equal marks.

- 2) Figures to right indicate full marks.
- 3) All questions are compulsory.
- 1. Attempt **all** of the following :
  - a) What is scrollable ResultSet?
  - b) Explain the absolute() method of ResultSet.
  - c) What are the differences between array and collection ?
  - d) What is the use of serializable interface ?
  - e) Define JAR.
  - f) Explain the use of scriplets.
  - g) Which technologies are provided by Java to develop Web Application ?
  - h) State the role of service() method.
  - i) What is Java Beans?
  - j) Define Remote Method Invocation.
- 2. Attempt **any two** of the following :
  - a) Define servlet. What is its use ? Explain servlet life cycle along with the syntax and use of each life method
  - b) Explain following different components in JSP:
    - i) Directives ii) Standard actions
    - iii) Implicite objects iv) JSP scriplets

Max. Marks: 40

 $(2 \times 5 = 10)$ 

 $(10 \times 1 = 10)$ 

[3618] - 405

#### *B/II/09/1,360*

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- c) Assume a database table 'Item' is already created in MS-access database. The table has following attributes :
  - ino number (integer)

name - text(20)

- qty number (integer)
- rate number (double)

Write a program to read the item details from console and insert them into table. Continue this process until user press'Y' to the prompt "Add More [Y/N]?:"

- 3. Attempt **any two** of the following :
  - a) Write a program to read n integers and add then into linkedlist collection. Display the collection. Separate odd integers and even integers into separate collections. Display the contents of odd and even numbers collection using iterator.
  - b) Write a program to create a thread as 'printmessage'. Create 2 instances of this thread that will display given message for n number of times by delay of 1 second each. Pass message and value of n as parameter while creating a thread.
  - c) What is the use of DatabaseMetaData and ResultMetaData. Give brief description of their methods.

4.	Attemp	ot any one of the following (A or B): (1×10:	=10)
	A) i)	Write a short note on cookies and session.	4
	ii)	Explain RMI Architecture, RMI classes and interfaces.	4
	iii)	Give any 4 constructors of thread class.	2
	B) i)	Differentiate between executeQuery() and executeUpdate() methods of Statement interface. Give their syntax and suitable example.	4
	ii)	Write servlet to list all cookies with their name and value as a response to t client.	the <b>4</b>
	iii)	What is Iterator and ListIterator ?	2

#### [3618] - 405

#### P.T.O.

# Max. Marks: 40

Instructions : 1) Neat diagrams must be drawn wherever necessary.
2) Black figures to the right indicate full marks.
3) All questions are compulsory.

- 1. Attempt all of the following :
  - a) Give any two differences between on-line and real time system.
  - b) Define cyclomatic complexity.
  - c) When 'phase-in' implementation is preferred ?
  - d) What are dummy modules ? Where do they exist ?
  - e) Differentiate between corrective maintenance and perfective maintenance.
  - f) What is ripple effect ?
  - g) Explain any two drawbacks of CASE TOOL.
  - h) "Lack of conformance to requirement is lack of quality". Justify it.
  - i) List any two errors found by "Black box testing".
  - j) Where composite data statistics is useful ?
- 2. Attempt **any two** of the following :
  - a) Explain about integrated CASE environments.
  - b) Explain CMM levels along with any two key process areas achieved at various level.
  - c) Explain user acceptance testing.

# 

Time: 2 Hours

# T.Y. B.Sc. (Semester – IV) Examination, 2009 COMPUTER SCIENCE CS – 346 : Software Engineering – II

(1×10=10)

#### $(2 \times 5 = 10)$

[3618] - 406

- 3. Attempt **any two** of the following :
  - a) Explain Top-down incremental approach with advantages and disadvantages.
  - b) Explain different types of maintenance.
  - c) Explain "Test data generators" with it's type.
- 4. Attempt the following :
  - a) The manager of a store is preparing to install a computer-based sales and inventory system. Employees are not literate about using computer.

The store does approximately 60% of it's annual business between November 1 and January 1 every year.

Assume that it is July 1.

- The Hardware and Software supplies estimate that it will take 90 days for the components to arrive.
- In addition to that it takes
  - 1 week to install, test the equipment and programs.
  - 1 week to train the personnel.
  - 2 weeks for conversion of data.
- i) The manager must decide whether to sign the contract right away and seek implementation during heavy shopping season or delay implementation until after January 1.

What are the advantages and disadvantages of each alternative ?

- ii) What would you recommend if you were the analyst ? Why ? 6
- b) Define 'Reengineering' and any four activity of it.

OR

b) Set the system boundaries for a

'Hospital Management System'

Show which part is done manually, in batch, on-line and Real time.

ges.

 $(2 \times 5 = 10)$ 

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