[4318] – 105

Seat No.	

S.Y.B.Sc. (Computer Science) (Semester – I) Examination, 2013
ELECTRONICS (Paper – I)
ELC – 211 : Microprocessor Architecture and Programming
(2008 Pattern)

Time : 2 Hours Max. Marks : 40

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

1. Answer the following questions in **one** or **two** sentences : **(10×1=10)**

a) In memory stack where is the stack pointer initialised ?

b) Which memories can be directly accessed by the CPU ?

c) Why two floating point instructions are not possible at the same time ?

d) What will be the result of XOR CX, CX ?

e) What is a device driver ?

f) Give the location and size of IVT.

g) State any two advantages of a flow chart.

h) Identify the type of instruction for the following :

i) DAA ii) CMC

i) What will be the contents of AL & BL register after executing the following ?

```
MOV AL, 62 H
MOV BL, AL
SHR AL, 4
AND BL, OFH
```

j) If AH = 08 H and INT 21 H is executed, what is the processor going to do ?

P.T.O.

2. Attempt **any two** of the following : **(2×5=10)**
   a) Explain the technique of segmentation used in virtual memory.
   b) What is a flag ? Explain any four flags of pentium operating in real mode.
   c) Explain any five assembler directives. Used in pentium.

3. Attempt **any two** of the following : **(2×5=10)**
   a) What is an interface unit ? Explain the need for an interface.
   b) Write a program to accept five characters from keyboard and display them on the screen.
   c) Explain the interrupt processing sequence.

4. Attempt **any one** of the following : **(1×10=10)**
   a) What is DMA ? What are the different types of DMA Transfer ? State the use of address register and word count register in a DMA controller.
   b) Name the addressing mode used in the following instructions.
      i) MOV AL, [BX]
      ii) MOV AX, BX
      iii) ADD CX, [250 H]
      iv) ADD CX, 250 H
      v) MOV AX, [BX] [SI]

      OR

   a) Mention the special functions of General Purpose Registers in pentium.
   b) Write an assembly language program to arrange 5 numbers in descending order.

———————

[4318] – 105

Seat No.	

S.Y.B.Sc. (Computer Science) (Semester – I) Examination, 2013
ELECTRONICS (Paper – I)
ELC – 211 : Microprocessor Architecture and Programming
(2008 Pattern)

Time : 2 Hours Max. Marks : 40

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

1. Answer the following questions in **one** or **two** sentences : **(10×1=10)**

a) In memory stack where is the stack pointer initialised ?

b) Which memories can be directly accessed by the CPU ?

c) Why two floating point instructions are not possible at the same time ?

d) What will be the result of XOR CX, CX ?

e) What is a device driver ?

f) Give the location and size of IVT.

g) State any two advantages of a flow chart.

h) Identify the type of instruction for the following :

i) DAA ii) CMC

i) What will be the contents of AL & BL register after executing the following ?

```
MOV AL, 62 H
MOV BL, AL
SHR AL, 4
AND BL, OFH
```

j) If AH = 08 H and INT 21 H is executed, what is the processor going to do ?

P.T.O.

2. Attempt **any two** of the following : **(2×5=10)**
   a) Explain the technique of segmentation used in virtual memory.
   b) What is a flag ? Explain any four flags of pentium operating in real mode.
   c) Explain any five assembler directives. Used in pentium.

3. Attempt **any two** of the following : **(2×5=10)**
   a) What is an interface unit ? Explain the need for an interface.
   b) Write a program to accept five characters from keyboard and display them on the screen.
   c) Explain the interrupt processing sequence.

4. Attempt **any one** of the following : **(1×10=10)**
   a) What is DMA ? What are the different types of DMA Transfer ? State the use of address register and word count register in a DMA controller.
   b) Name the addressing mode used in the following instructions.
      i) MOV AL, [BX]
      ii) MOV AX, BX
      iii) ADD CX, [250 H]
      iv) ADD CX, 250 H
      v) MOV AX, [BX] [SI]

      OR

   a) Mention the special functions of General Purpose Registers in pentium.
   b) Write an assembly language program to arrange 5 numbers in descending order.

———————

[4318] – 107

Seat No.	

S.Y.B.Sc. (Semester – I) Examination, 2013
COMPUTER SCIENCE
Electronics (Paper – II)
ELC – 212 : Process Control Instrumentation
(Old Course)

Time : 2 Hours Max. Marks : 40

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

1. Answer the following in **one** or **two** sentences : **(10×1=10)**

   a) Define active sensor.

   b) What is 'hold mode' of sample and hold circuit ?

   c) Name the signal conditioner required for RTD.

   d) Write an output equation of a controller in derivative mode.

   e) Name the software useful for process control simulation.

   f) Draw single channel data acquisition system.

   g) State any one drawback of proportional controller.

   h) State working principle of semiconductor strain gauge.

   i) What is stepper motor ?

   j) Which materials are used in liquid-expansion thermometers ?

2. Attempt **any two** of the following : **(2×5=10)**

   a) With neat diagram, explain how pair of photosource and photodetector is used for ranging application.

   b) What are different types of analysis possible using PSPICE ?

   c) Draw the block diagram of automatic control system and explain.

P.T.O.

3. Attempt **any two** of the following : **(2×5=10)**

   a) The output of an OP-AMP based proportional controller is – 10 V. Corresponding to 0% output and +10 V for 100% output. Determine the actual output for 80% controller output.

   b) Explain how bimetal strip is used as temperature sensor.

   c) Describe any five parameters of data acquisition system.

4. Attempt **any one** : **(1×10=10)**

   a) i) Explain any two signal conditioning techniques used in process control.

      ii) Explain working principle of sample and hold circuit.

      OR

   b) i) Explain integral control mode.

      ii) What is seeback effect ? How it is used in thermocouple ? State suitable signal conditioner for this sensor.

———————

[4318] – 108

Seat No.	

S.Y.B.Sc. (Semester – I) Examination, 2013
COMPUTER SCIENCE : COMPULSORY ENGLISH
(2008 Pattern)

Time : 2 Hours Max. Marks : 40

1. Answer the following (**any two**) : **10**

   A) State the various pathways of communication with suitable examples.

   B) Write a brief note on body language.

   C) State the features of effective communication from sender's point of view.

2. Answer the following :

   A) Use the following words in sentences to bring out their literal and figurative meanings (any two). **4**

      i) Blue ii) Hot iii) Live

   B) Differentiate between the following pairs of words and make sentences (any two) : **4**

      i) Sensible, sensitive

      ii) Hard, hardly

      iii) Legible, eligible.

   C) Answer the following :

      A) Choose the correct spelling. **2**

         1) Acommodation, accommodation, accomodation

         2) Momento, momentoe, memonto.

3. Answer the following :

   A) Match the synonyms in the two columns. **4**

A	B
a) appear	i) useless
b) elementary	ii) compulsory
c) futile	iii) seem
d) mandatory	iv) basic

P.T.O.

B) Re-order the jumbled words with the help of the hints given in the brackets. **4**

i) tnolsvnei (one who does not have money)

ii) strnaipeed (one who walks)

iii) treenva (a person having long experience)

iv) simopitt (one who is always positive).

C) Transcribe the following (**any two**). **2**

i) phone ii) teach iii) short

4. Answer the following **(any two)** : **10**

A) Write a brief talk on “Global Warming”.

B) You are talking to your mother’s friend whom you run into a book shop. You are in a hurry to leave. How would you close the conversation ?

C) Give acceptable combinations for the following collocations.

i) A nice intention

ii) A silver opportunity

iii) Easy English

iv) A large mistake

v) Earlier knowledge.

———————

[4318] – 102

Seat No.	

S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2013
(New) (2008 Pattern) (Paper – II)
CS – 212 : RELATIONAL DATABASE MANAGEMENT SYSTEM (RDBMS)

Time : 2 Hours Max. Marks : 40

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

1. Attempt **all** of the following : **(10×1=10)**

a) List the different operators in MYSQL.

b) What is the output of the following ?

Select floor (–1.23) ;

c) What is system throughput ?

d) Define Secrecy.

e) State the purpose of revoke command.

f) Write a query in MYSQL to display 4 (four) records from employee table.

g) What is Fat Server ?

h) What is Filtering ?

i) State commit point.

j) What is Intension lock ?

P.T.O.

2. Attempt **any two** of the following : **(2×5=10)**

   a) Explain Thomas Write rule with suitable example.

   b) Explain Client-Server Architecture in detail.

   c) Explain with suitable example types of Schedules based on recoverability.

3. Attempt **any two** of the following : **(2×5=10)**

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

   [Start – Transaction, T_1]

   [Write – item, T_1, A, 20]

   [Commit, T_1]

   [Checkpoint]

   [Start – Transaction, T_4]

   [Write – item, T_4, C, 25]

   [Write – item, T_4, B, 15]

   [Commit, T_4]

   [Start – Transaction, T_2]

   [Write – item, T_2, C, 20]

   [Start – Transaction, T_3]

   [Write – item, T_3, A, 30]

   [Write – item, T_2, D, 25] $\leftarrow$ System Crash.

   If deffered update with checkpoint is used. What will be the recovery procedure ?

   b) Explain failures classification in detail.

   c) Explain time-stamp based protocol.

4. Attempt the following : **(2×5=10)**

a) The following is the list of events in an interleaved execution of set of transaction T_1, T_2, T_3 and T_4 with two phase locking protocol.

Time	Transaction	Code
t_1	T_1	Lock (A, X)
t_2	T_2	Lock (B, S)
t_3	T_3	Lock (A, S)
t_4	T_4	Lock (B, S)
t_5	T_1	Lock (B, X)
t_6	T_2	Lock (C, X)
t_7	T_3	Lock (D, S)
t_8	T_4	Lock (D, X)

Construct a wait-for graph according to above request. Is there deadlock at any instance ? Justify.

b) Differentiate between stored function and stored procedure with example.

OR

What are different services provided by server components ?

———————

[4318] – 106

Seat No.	

S.Y. B.Sc. (Semester – I) Examination, 2013
COMPUTER SCIENCE
Electronics (Paper – II)
ELC – 212 : Communications Principles
(New Course) (2008 Pattern)

Time : 2 Hours Max. Marks : 40

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Neat*** *diagrams must be drawn* ***wherever*** *necessary.*

1. Answer the following in **one** or **two** sentences : **(10×1=10)**

a) Define baud rate.

b) For the data, 10110010, draw the waveform for ASK.

c) State any two functions of Network Switching Subsystem (NSS) under GSM.

d) What is need of guard band in FDM ?

e) Which type of antenna is present in a handset of a cellphone ?

f) Define simplex communication system.

g) State any two types of spread spectrum modulation technique.

h) Mention the modes given by IEEE 802.11 for a wireless LAN.

i) QAM is a combination of which modulation techniques ?

j) How many characters are used in SMS services ?

P.T.O.

2. Attempt **any two** of the following : **(2×5=10)**

   a) Draw and explain block diagram of communication system.

   b) Explain FDM technique used in telephony system.

   c) Draw and explain general architectural layers of bluetooth.

3. Attempt **any two** of the following : **(2×5=10)**

   a) Draw and explain PCM modem.

   b) Define following parameters of antenna :

      i) Radiation pattern

      ii) Half power beam width

      iii) Radiation intensity

      iv) Directivity

      v) Power gain.

   c) State important features of CDMA.

4. Attempt the following questions (**any one**) : **(1×10=10)**

   a) i) Explain asynchronous communication.

      ii) Explain the cellular concept of mobile communication system. Also explain concept of “Frequency-reuse” in mobile communication.

      OR

   b) i) Compare active and passive RFID.

      ii) Explain AM w.r.t. following points :

      Concept, waveform, modulation index, frequency spectrum, merits and demerits.

[4318] – 103

Seat No.	

S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2013
MATHEMATICS (Paper – I)
MTC-211 : Linear Algebra
(2008 Pattern)

Time : 2 Hours Max. Marks : 40

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

1. Attempt **each** of the following : **10**

i) Let $A = \begin{bmatrix} 2 \\ -1 \\ 4 \\ 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 \\ -1 \\ x \\ 2 \end{bmatrix}$. If $A \cdot B = 13$, find x.

ii) Consider the matrix $A = \begin{bmatrix} 2 & 2 & 3 \\ 1 & 2 & 1 \\ 2 & -2 & 1 \end{bmatrix}$. Determine if the vector $\overline{X} = \begin{bmatrix} 2 \\ 3 \\ -2 \end{bmatrix}$ is an eigenvector of A.

iii) Consider the basis $S = \{\overline{p}_1 = t^2 + t, \overline{p}_2 = t - 1, \overline{p}_3 = t + 1\}$ of $\mathbb{P}_2$. If the coordinate vector of $\overline{p}$ with respect to S is (1, 2, –1), then find $\overline{p}$.

iv) If A is 5 × 7 matrix and rank A = 3, then what is nullity of A ?

v) Let $\overline{u} = (2, 2, -4)$ and $\overline{v} = (a, 1, -1)$. For what values of 'a' are $\overline{u}$ and $\overline{v}$ orthogonal ?

vi) Let $L : \mathbb{P}_1 \to \mathbb{R}^2$ be defined by L (at + b) = (a – 2b, b + 5). Determine if L is a linear transformation

vii) Consider the linear transformation $L : \mathbb{R}^3 \to \mathbb{R}^3$, defined by L (a, b, c) = (0, a + 2b, b + c). Determine if the vector $\overline{u} = (-4, 2, -2)$ is in Ker L.

P.T.O.

viii) Determine if the set $W = \{(x, y)/x^2 - y^2 = 0\}$ is a subspace of the vector space $\mathbb{R}^2$.

ix) For which values of 'a', does the following homogeneous system of linear equations has only the trivial solution ?

$x + 2y = 0$

$ax + y = 0$

x) Define orthogonal matrix.

2. Attempt **any two** of the following : **10**

i) If $S = \{\bar{v}_1, \bar{v}_2, ..., \bar{v}_n\}$ is a basis for a vector space V and $T = \{\bar{w}_1, \bar{w}_2, ..., \bar{w}_r\}$ is a linearly independent set of vectors in V, then prove that $r \leq n$.

ii) Determine if the set of vectors {(2, 1, 1), (–1, 0, 1), (0, 1, 0)} forms a basis for $\mathbb{R}^3$.

iii) Solve the following system of linear equations by Gauss-Jordan elimination method

$$\begin{aligned} x + 2y + 3z - w &= 0 \\ 2x + y - z + w &= 3 \\ x - y + w &= -2 \end{aligned}$$

3. Attempt **any two** of the following : **10**

i) Prove that the eigenvalues of an $n \times n$ matrix A are the roots of the characteristic equation $\det(\lambda I_n - A) = 0$ of A.

ii) If $L : V \to W$ is a linear transformation, then prove that range (L) is a subspace of W.

iii) Let $L : \mathbb{R}^3 \to \mathbb{R}^2$ be a linear transformation defined by

$$L\left(\begin{bmatrix} x \\ y \\ z \end{bmatrix}\right) = \begin{bmatrix} x - y + 2z \\ 4x - 5z \end{bmatrix}.$$

Obtain the matrix of L with respect to the bases $S = \{\bar{v}_1, \bar{v}_2, \bar{v}_3\}$ for $\mathbb{R}^3$ and $T = \{\bar{w}_1, \bar{w}_2\}$ for $\mathbb{R}^2$; where $\bar{v}_1 = \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}$, $\bar{v}_2 = \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$, $\bar{v}_3 = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$, and T be the standard basis of $\mathbb{R}^2$.

4. Attempt **any one** of the following : **10**

i) a) Find all eigenvalues of the matrix $A = \begin{bmatrix} 1 & -3 & 3 \\ 3 & -5 & 3 \\ 6 & -6 & 4 \end{bmatrix}$. Also find the basis of the eigenspace of A corresponding to the smallest eigenvalue of A. **5**

b) Use the Gram-Schmidt process to find an orthonormal basis for the subspace of $\mathbb{R}^3$ with the basis {(1, 1, 1), (–1, 1, 1)}. **5**

ii) a) Find a basis of row vectors of the following matrix A that consists of row vectors of A only **5**

$$A = \begin{bmatrix} 1 & 2 & -1 & 3 \\ 3 & 5 & 2 & 0 \\ 0 & 1 & 2 & 1 \\ -1 & 0 & -2 & 7 \end{bmatrix}$$

b) Prove that the nonzero vectors $\bar{v}_1, \bar{v}_2, ..., \bar{v}_n$ in a vector space V are linearly dependent if and only if one of the vectors $\bar{v}_j$, $j \geq 2$; is a linear combination of the preceding vectors $\bar{v}_1, \bar{v}_2, ..., \bar{v}_{j-1}$. **5**

———————

[4318] – 104

Seat No.	

S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2013
MATHEMATICS (Paper – II)
MTC-212 : Numerical Analysis
(2008 Pattern)

Time : 2 Hours Max. Marks : 40

***Note** : 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 **each** of the following : **10**

i) Define : Absolute error.

ii) Evaluate $\Delta(\cot^{-1} x)$.

iii) State Descarte's rule of sign.

iv) Write the formula for Regula-falsi method.

v) Write the forward difference table

x	1	3	5	7	9
y	2	10	26	50	82

vi) If the approximate value of 2.013 is 2, find percentage error.

vii) Prove that , $\Delta\nabla \equiv \Delta - \nabla$.

viii) True or false : Rate of convergence of Newton-Raphson method is 2.

ix) If f(0)=0, f(1)=2, f(2) = 6 and f(3) = 12, evaluate $\int_0^3 f(x)\,dx$ by Simpson's $\frac{3}{8}^{th}$ rule.

x) Write Runge-Kutta formula of second order for solving ordinary differential equation.

P.T.O.

2. Attempt **any two** of the following : **10**

   i) Find a real root of the equation xlog(x) – 1.2 = 0 by Bisection method in the interval [1, 2]. Perform 4 iterations.

   ii) The population of a town in decennial census were as under

Year	1921	1931	1941	1951	1961
Population (in thousands)	46	66	81	93	101

   Estimate the population for the year 1955.

   iii) Prove that,

   a) $(1+\Delta)(1-\nabla) \equiv 1$ b) $\mu \equiv \frac{1}{2}\left[E^{1/2} + E^{-1/2}\right]$.

3. Attempt **any two** of the following : **10**

   i) Derive Lagrange's interpolation formula for the set of points (x_i, y_i), i = 0, 1, 2, ..., n where $y_i = f(x_i)$.

   ii) Find $\sqrt[3]{18}$ by Newton-Raphson method. Perform 4 iterations. Take x_0=2.5.

   iii) From the following table of values of x and y, obtain $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ for x = 1.2

x	1.0	1.2	1.4	1.6	1.8	2.0	2.2
y	2.7183	3.3201	4.0552	4.9530	6.0496	7.3891	9.0250

4. Attempt **any one** of the following : **10**

   i) a) Derive Simpson's $\frac{1}{3}^{rd}$ rule for numerical integration. **5**

   b) Use Runge-Kutta fourth order method to solve $\frac{dy}{dx} = y - x$, where y(0) = 2. Obtain y(0.1) and y(0.2). [Take h = 0.1]. **5**

   ii) a) Derive the formula to solve $\frac{dy}{dx} = f(x, y)$, where $y = y_0$ when $x = x_0$, by Euler's method. **5**

   b) Compute the value of $\int_0^1 \frac{dx}{1+x^2}$ by using trapezoidal rule with h = 0.125. **5**

[4318] – 203

Seat No.	

S.Y. B.Sc. (Computer Science) (Semester – II) Examination, 2013
MATHEMATICS (Paper – I)
MTC-221 : Computational Geometry
(2008 Pattern)

Time : 2 Hours Max. Marks : 40

Note : *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 **each** of the following : **10**

i) If we apply a 2 ×2 transformation matrix $[T] = \begin{bmatrix} 2 & 1 \\ -4 & 2 \end{bmatrix}$ onto the line $3x - 2y - 8 = 0$, then find slope of the resulting line.

ii) Write the definition of orthographic projection.

iii) Write the transformation matrix of an isometric projection (take $\phi > 0$ and $\theta < 0$).

iv) First reflect the point P(10.5, 7.3) through X-axis and then translate in x and y directions by – 6.5 and 15.7 units, respectively.

v) Determine if the transformation of reflection through Y-axis is a solid-body transformation. Justify your answer.

vi) If we apply shearing in x and y-directions by 2 and – 3 units, respectively, onto a circle, then we get a plane figure of area $(343\pi)\,cm^2$. Determine the radius of the original circle.

P.T.O.

vii) If we apply the 2 × 2 transformation matrix onto the points A(1, 0) and B(0, 1); then they are transformed to the points $A^*(4, 1)$ and $B^*(-2, 2)$ respectively. What is the transformation matrix ?

viii) Write the definition of vanishing points.

ix) Find the transformation matrix of reflection through the y = 2.5 plane.

x) Write the transformation matrix of rotation about the Z-axis through an angle (–40°).

2. Attempt **any two** of the following : **10**

i) Derive the transformation matrix for rotation about the origin through an angle 'θ'.

ii) Rotate the line-segment between the points A(2, – 5) and B(– 6, 11) about its midpoint through an angle $\left(\frac{\pi}{4}\right)^C$.

iii) Determine through what angles the plane x + y + z = 0 be rotated about the X-axis and then about the Y-axis, so that it coincides with the z = 0 plane.

3. Attempt **any two** of the following : **10**

i) Find the trimetric projection formed by first rotation about the Y-axis through an angle 75°; followed by rotation about the X-axis through an angle 20°; followed by the orthographic projection onto the z = 0 plane. Determine principle foreshortening factors also.

ii) Derive the rotation angle 'ϕ' about the Y-axis and rotation angle 'θ' about the X-axis in dimetric projection for the given principle foreshortening factor f_z along Z-axis.

iii) Write an algorithm for rotation through angle 'δ' about a line passing through the point (x_0, y_0, z_0) and having direction cosines (C_x, C_y, C_z).

4. Attempt **any one** of the following. **10**

i) a) Find the parametric equation of the Bezier curve determined by the control points $B_0(-2, -3)$, $B_1(-1, 2)$, $B_2(3, 5)$ and $B_3(6, 2)$. Find the points on the curve corresponding to the parameter values t = 0.37, 0.65 and 0.2. **5**

b) Find the recursive equation to generate uniformly spaced 30 points on the arc in the first quadrant, of the hyperbola $\frac{x^2}{4} - \frac{y^2}{5.29} = 1;$ for $4 \leq x \leq 10$. **5**

ii) a) Find uniformly spaced 5 points on the arc of the circle in the second quadrant, where equation of the circle is $x^2 + y^2 = 26.01$. **5**

b) Find the concatenated transformation matrix for first scaling in x and z coordinates by factors 4 and 6, respectively; followed by single point perspective projection onto the y = 0 plane from center of projection at $y_c = 20$ on the Y-axis. Apply this transformation onto the point P(2, 2, – 1). **5**

———————

[4318] – 206

Seat No.	

S.Y. B.Sc. (Semester – II) Examination, 2013
Computer Science
ELECTRONICS (Paper – II)
ELC-222 : Digital Signal Processing
(2008 Pattern)

Time : 2 Hours Max. Marks : 40

***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 : **(1×10=10)**

   a) What is significance of sampling process ?

   b) Define the Laplace transform of a function x(t) with mathematical expression.

   c) State the role of Barrel Shifter in DSP processor.

   d) List any two parameters of an image.

   e) Express the DT signal $x(n) = \{-1, 2, 3, \underset{\uparrow}{0}, 1, 2, 0\}$ graphically.

   f) Define the transfer function of a DT system.

   g) List two types of cache memories used in digital signal processors.

   h) State any two uses of a RADAR.

   i) If x(n) has 5 discrete points and h(n) has 4 discrete points, how many points the convolved function y(n) will have ?

   j) What is a digital filter ?

2. Attempt **any two** of the following : **(2×5=10)**

   a) Differentiate between FIR and IIR filters.

   b) Explain DSP architecture design considerations.

   c) Explain any five parameters of an ADC.

P.T.O.

3. Attempt **any two** of the following : **(2×5=10)**

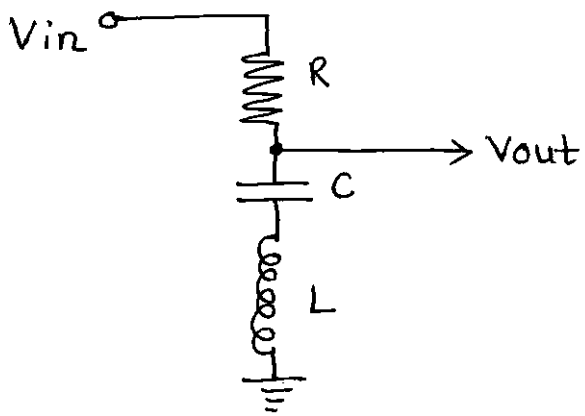
   a) Explain following types of signals with suitable examples.

      i) Random and deterministic signals

      ii) Periodic and non-periodic signals

   b) Find the transfer function of given circuit using S-domain analysis :

      $R = 100\ \Omega$, $C = 1\mu F$, $L = 10$ mH



   c) Give the comparison between fixed point and floating point Digital Signal Processors.

4. Attempt **any one** of the following : **(1×10=10)**

   a) i) Explain various steps involved in speech recognition with a suitable diagram. **5**

      ii) Draw block diagram of DSP system. Give different advantages of DSP system. **5**

      OR

   b) i) How echo is generated in telephony system ? How it can be cancelled using adaptive filters ? **5**

      ii) State the types of correlation. Give mathematical expression for each type. List the applications of correlation. **5**

———————

[4318] – 101

Seat No.	

S.Y. B.Sc. (Computer Science) (Semester – I) Examination, 2013
(Paper – I) (2008 Pattern)
CS-211 : DATA STRUCTURES USING C

Time : 2 Hours Max. Marks : 40

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

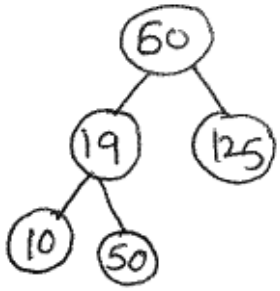
1. Attempt **all** the following : **(1×10=10)**

a) Write one advantage of Data structure.

b) Which notation is used to denote lower bound ?

c) Write the formula for calculating address of any element in row major representation of two dimensional array.

d) Write preorder of following Binary Search Tree.



e) Define node structure for doubly linked list.

f) Define Priority Queue.

g) Name the data structure used in recursion.

h) Write the difference between Binary search tree and AVL Tree.

i) State any two applications of Graph.

j) State the purpose of topological sort.

P.T.O.

2. Attempt **any two** of the following : **(2×5=10)**

   a) Write a ‘C’ function to calculate average of elements in singly linked list of integers.

   b) Write a ‘C’ function to reverse a string using stack (Do not define any stack functions).

   c) Write a ‘C’ function to find maximum element from Binary Search Tree.

3. Attempt **any two** of the following : **(2×5=10)**

   a) Sort the following data using Heap Sort procedure

      30, 55, 48, 37, 10, 91, 84, 2.

   b) Convert the following infix expression to postfix expression. Show the stack contents at each conversion

      $P - Q \hat{} R + S * T - U \cdot$

   c) Consider the following adjacency matrix

$$\begin{array}{c} \\ 1 \\ 2 \\ 3 \\ 4 \end{array} \begin{array}{c} \begin{array}{cccc} 1 & 2 & 3 & 4 \end{array} \\ \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 \end{bmatrix} \end{array}$$

      i) Draw the Graph

      ii) Draw the Adjacency list

      iii) Draw the Inverse Adjacency List.

4. Attempt **any one** of the following **(A or B)** : **(1×10=10)**

   A) a) Write an algorithm for BFS traversal of a Graph. **4**

      b) Define Generalized linked list and write its node structure. Draw GLL for following list

         L = ((a, c), d) **3**

c) Define : **3**

i) AOE Network

ii) Balance Factor

iii) Data type.

OR

B) a) Consider a Deque of characters with following scenario Left = 4, Right = 3, Q size = 6

–, –, P, Q, –, –

What will happen when following operations performed :

i) insertleft(z)

ii) deleteright

iii) deleteright

iv) insertright (w). **4**

b) Write a short notes on space complexity. **3**

c) Construct binary search tree for following data. Show the tree at each step

34, 91, 30, 31, 80, 85, 138. **3**

———————

[4318] – 201

Seat No.	

S.Y. B.Sc. (Computer Science) (Semester – II) Examination, 2013
CS-221 : OBJECT ORIENTED CONCEPTS AND PROGRAMMING IN C++
(2008 Pattern)

Time : 2 Hours Max. Marks : 40

Instructions : *i)* ***All*** *questions are* ***compulsory****.*
ii) ***All*** *questions carry* ***equal*** *marks.*
iii) Assume suitable data if necessary.
iv) Black figures to the ***right*** *indicate* ***full*** *marks.*

1. Attempt **all** of the following : **(1×10=10)**

a) Differentiate between structure and class in C++.

b) Write syntax to invoke static member function.

c) What is the order of execution of constructors ?

```
Class A : public B, virtual public C
{     :
} ;
```

d) How many explicit arguments are required if binary operator is overloaded using member function ?

e) State one advantage of generic function.

f) What is the difference between pointer and a reference variable ?

g) Justify true/false : “function can not return class object”.

h) Write the syntax of pure virtual function.

i) Write meaning of ios :: trunc file mode parameter.

j) The generic catch block must be the first among all catch blocks. State true or false.

P.T.O.

2. Attempt **any two** of the following : **(2×5=10)**

   a) Illustrate array of objects with example.

   b) Explain dynamic memory management operators in C++ with example.

   c) Consider following class declaration :

```
class matrix
{ int a[5] [5] ;
public : void getdata ( ) ; || Accepts matrix elements
         void putdata ( ) ; || Displays matrix elements
         :
} ;
```

   Write appropriate operator function to overload.

   i) Binary + : To add two matrices.

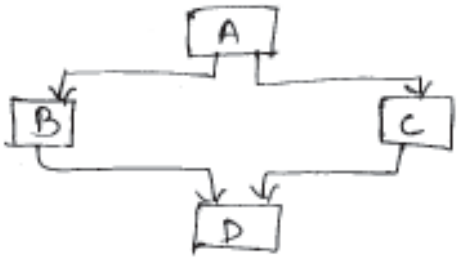
   ii) Unary – : To change sign of each of its elements.
   (Use member functions for operator overloading)

3. Attempt **any two** of the following : **(2×5=10)**

   a) What is constructor ? Explain overloading of constructor with example.

   b) Write a C++ program to read character data from a file. Create one file to store all capital alphabets and another file to store all small case alphabets. Also display contents of both files.

   c) Consider following class hierarchy :



   Class A, B, C and D has one integer data member p, q, r and s respectively. Write appropriate member functions in each class to accept and display data. Also write member function in class D to perform s = p + q + r.

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

A) i) What is class template with multiple parameters ? Explain with suitable example. **5**

ii) Explain the use of the following with syntax. **5**

a) try b) throw c) catch

OR

B) i) What is friend function ? Give syntax to declare friend function. What are the features of friend function ? **4**

ii) Identify the output of the following code segment and justify. **3**

```
class base
{ public :
  virtual void base func ( ) { cout << "Base" ; }
} ;
class deri : public base
{ public :
    void basefunc ( ) { cout << "\nDerived" ; }
} ;
void somefun ( base * baseobj)
{ baseobj → basefunc ( ) ; }
int main ( )
{ base baseobject ;
  somefun (& baseobject) ;
  deri deriobject ;
  somefun (& deriobject) ;
}
```

iii) Identify error in the following code segment if any and justify. **3**

```
class ABC
{   int x ;
    int y ;
public :
    ABC (int i, int j) : y(i), x(y * j) { }
} ;
```

———————

[4318] – 202

Seat No.	

S.Y. B.Sc. (Computer Science) (Semester – II) Examination, 2013
CS-222 : SOFTWARE ENGINEERING – II
(2008 Pattern)

Time : 2 Hours Max. Marks : 40

Instructions *: i)* ***All*** *questions are* ***compulsory****.*
ii) ***All*** *questions carry* ***equal*** *marks.*
iii) Black figures to the ***right*** *indicate* ***full*** *marks.*

1. Attempt **all** of the following : **(1×10=10)**

   a) Define product-line software.

   b) List the four framework activities of PSP model.

   c) Give any two advantages of incremental model.

   d) State any two software myths that management could have.

   e) State two human factors for agile process.

   f) User interface design should be tuned to the needs of end user. Justify true/false.

   g) What do you mean by world view ?

   h) State IEEE definition of requirement.

   i) List any two rules of thumb that should be followed when creating the analysis model.

   j) What is the role of 'Intent' presented in a standard template of analysis pattern ?

2. Attempt **any two** of the following : **(2×5=10)**

   a) Write short note on concurrent development model.

   b) Explain inception in detail.

   c) Discuss the steps required to initiate requirement engineering process.

P.T.O.

3. Attempt **any two** of the following : **(2×5=10)**

   a) Explain any five core principles that guide a process.

   b) Write a short note on BPE.

   c) State and explain the inputs and outputs required for domain analysis.

4. Attempt the following : **(2×5=10)**

   a) Explain the key XP activities.

   OR

   a) Explain the layers of software engineering.

   b) Draw context level, first level DFD and ER diagram for “Airline Reservation System”.

———————

[4318] – 204

Seat No.	

S.Y. B.Sc. (Computer Science) (Semester – II) Examination, 2013
Mathematics (Paper – II)
MTC – 222 : OPERATIONS RESEARCH
(2008 Pattern)

Time : 2 Hours Max. Marks : 40

Note : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Use of single memory, non-programmable scientific calculator is ***allowed****.*
4) Graph papers will be ***supplied*** *on demand.*

1. Attempt **each** of the following : **10**

i) Write the dual of the following Linear Programming problem.

Minimize $(z) = 5x_1 + 2x_2$

Subject to

$$4x_1 - x_2 \geq 4$$
$$x_1 + 2x_2 = 6$$
$$x_1 - 2x_2 \leq 3$$
$$x_1, x_2 \geq 0$$

ii) Show feasible region of the following LPP by graphically.

Maximize $(z) = x_1 + x_2$

Subject to $2x_1 + x_2 \leq 10$

$$2x_1 + x_2 = 10$$
$$x_1, x_2 \geq 0$$

iii) Define surplus variable.

iv) What is condition for degeneracy in Transportation problem ?

v) How do you convert the maximization assignment problem into minimization one ?

vi) Find Initial basic feasible solution of the following transportation problem by North West corner method.

	W_1	W_2	W_3	
O_1	5	6	9	30
O_2	12	10	11	35
	20	20	20	

P.T.O.

vii) Define the term : Mixed strategy.

viii) For what value of λ, the game with following pay-off matrix is strictly determinable ?

Player – B

$$\text{Player A} \begin{bmatrix} \lambda & 6 & 2 \\ -1 & \lambda & -7 \\ -2 & 4 & \lambda \end{bmatrix}$$

ix) Write the standard form of the following LPP.

Maximize $(z) = x - y + 2z$

Subject to $x - z \geq 4$

$y + 2z \leq 5$

$x - y + z = 3$

$x, y, z \geq 0$

x) Solve the following assignment problem for minimization.

	A	**B**	**C**
I	5	6	7
II	7	6	5
III	8	9	8

2. Attempt **any two** of the following : **10**

i) A firm manufactures two products A and B on which the profit earned per unit are Rs. 3 and Rs. 4 respectively. Each product is processed on two machines M_1 and M_2. Product A requires one minute of processing time on M_1 and two minutes on M_2, while B requires one minute on M_1 and one minute on M_2. Machine M_1 is available for not more than 450 minutes, while machine M_2 is available for 600 minutes during any working day. Formulate the LPP and solve it by graphically.

ii) Solve the following LPP by simplex method.

Maximize $(z) = x_1 + x_2$

Subject to $-x_1 + 3x_2 \leq 10$

$x_1 + x_2 \leq 6$

$x_1 - x_2 \leq 2$

$x_1, x_2 \geq 0$

iii) A company is faced with the problem of assigning 4 machines to 6 different jobs (one machine to one job only). The profits are estimated as below.

		Machine			
		A	**B**	**C**	**D**
Job	**I**	3	6	2	6
	II	7	1	4	4
	III	3	8	5	8
	IV	6	4	3	7
	V	5	2	4	3
	VI	3	7	8	4

Solve the problem to maximize the total profit.

3. Attempt **any two** of the following : **10**

i) Solve the following 4×2 game by graphically. **5**

		Player B	
		I	II
Player A	I	1	6
	II	8	5
	III	5	4
	IV	10	3

ii) Find Initial basic feasible solution of the following transportation problem by VAM. **5**

		ware house				
		W_1	W_2	W_3	W_4	**Supply**
Origin	O_1	1	2	–2	3	70
	O_2	2	4	0	1	38
	O_3	1	2	–2	5	32
	Demand	40	28	30	42	

iii) Solve the following assignment problem for minimization. **5**

	A	B	C	D
I	5	5	–	2
II	7	4	2	3
III	9	3	5	–
IV	7	2	6	7

4. Solve **any one** of the following : **10**

i) a) Reduce the following game by dominance principle and solve it. **5**

Player – B

Player – A	I	II	III	IV
I	5	2	4	0
II	3	4	2	4
III	6	2	4	0
IV	0	4	0	8

b) Solve the following game. **5**

Player – B

Player – A	I	II	III	IV	V
I	9	3	1	8	0
II	6	5	4	6	7
III	2	4	3	3	8
IV	5	6	2	2	1

ii) Find the Initial basic feasible solution of the following transportation problem by matrix minima method and obtain its optimal solution by MODI method. **10**

	D_1	D_2	D_3	D_4	a_i
O_1	2	3	4	5	6
O_2	5	4	3	1	8
O_3	1	3	3	2	10
b_j	4	6	8	6	

[4318] – 205

Seat No.	

S.Y. B.Sc. (Computer Science) (Semester – II) Examination, 2013
ELC – 221 : ELECTRONICS (Paper – I)
Microcontroller and Embedded Systems
(2008 Pattern)

Time : 2 Hours Max. Marks : 40

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 : **(1×10=10)**

a) What is the address stored in stack pointer and program counter after 8051 is reset ?

b) Which address of internal RAM is used for bit addressing ?

c) Which port pins are used for accessing external interrupts ?

d) What will be the effect of instruction

back : JNB P1.5, back

end.

e) If T_H register in Mode 2 operation is loaded with – 50, then after how many clock pulses the timer overflow flag will be set ?

f) Give the vector address for Timer-0 and serial communication interrupts.

g) Mention the role of line drivers in serial communication.

h) Define Emulator.

i) Define IDE.

j) Give the standard reference current for DAC 0808.

P.T.O.

2. Attempt **any two** of the following : **(2×5=10)**

   a) With neat diagram explain the internal RAM organisation in 8051.

   b) Write an assembly language program to generate a square wave on port pin P1.6 having 60% duty cycle.

   c) Write an assembly language program to accept data serially and continuously and send it to port 1 for display. Assume crystal frequency as 11.0592 MHz and baud rate 1200.

3. Attempt **any two** of the following : **(2×5=10)**

   a) Write an assembly language program to generate 20 KHz square wave with 50% duty cycle on port pin P2.5. Use 8-bit autoreload mode of Timer 1 operation. Assume crystal frequency as 12 MHz.

   b) Classify the following instructions according to the addressing mode used :

      i) INC 50 H

      ii) ANL A, # 30 H

      iii) MOV @ R_1, A

      iv) CPL A

      v) MOV 60 H, 70 H

   c) With a neat diagram show how DAC 0808 is interfaced to 8051. Write an assembly language program to generate triangular waveform.

4. Attempt **any one** of the following : **(1×10=10)**

A) a) i) Explain the function of PSW.6 and PSW.2 bits. **2**

ii) Give the functions of cross compiler, locator and loader. **3**

b) i) Mention the function of port 0 and port 2 of 8051 during external memory interfacing. **2**

ii) Draw the bit format of T_{CON} register. Explain the function of lower nibble bits. **3**

B) a) Draw block diagram of embedded system and explain the function of timer and data memory section. **5**

b) i) List different interrupts of 8051 according to their priority and give their vector addresses. **3**

ii) Define full scale output voltage and resolution of DAC. **2**

———————

[4318] – 207

Seat No.	

S.Y. B.Sc. (Computer Science) (Semester – II) Examination, 2013
COMPULSORY ENGLISH
(2008 Pattern)

Time : 2 Hours Max. Marks : 40

1. Answer **any two** of the following : **10**

   A) Deepak, Jyoti, Prakash and Arati are given a topic, "The role of Indian films in social reform". Write the transcript of the discussion in a dialogue form.

   B) Prepare a brief talk on "Olympic Games".

   C) Write a note on the Interview Techniques.

2. Answer **any two** of the following : **10**

   A) Punctuate the following sentences.

      1) We know the Joglekars very well they used to be our neighbours in Panchgani.
      2) Is there any matter arising from the minutes.
      3) do you think this will work ?
      4) I must be dreaming.
      5) Let's start shall we ?

   B) Write a review of a television serial.

   C) Summarize the passage.

   Creative writing is very different from the regular writing you would do in a chemistry or geography class or in an official letter or report, the purpose of all of which is simply to convey information. When you write formal letters, informative articles or research proposals, there are certain rules to follow in with regard to format, language expressions and style. But when doing a

P.T.O.

piece of creative writing, such as a story or a description of a person, place or experience, you have the chance to say things in your own way and in a style and language that is yours alone and, in fact, it is best to avoid imitating someone else when doing creative writing. Creative writing allows you to experiment with style and use language in a novel way by adding metaphors, dialogues and colourful vocabulary to create the mood you want to in the mind of the reader. Your writing can mirror emotions such as humour, joy and sadness. It can have a tone that is sympathetic or critical, light- hearted or serious.

3. Answer **any two** of the following : **10**

   1) Write a paragraph on Jan Lokpal Bill.

   2) Rearrange the jumbled sentences in order to make a meaningful paragraph.
      1) Fungi are widespread.
      2) Most of the infections fungi cause in humans are mild and easily treated.
      3) Fungi are among the four types of micro-organism that cause disease in humans.
      4) Fungi are plants that feed off other organism, living or dead.
      5) It has not been a high priority to develop vaccines against fungi.

   3) Write a note on the Editing Skills.

4. Answer **any two** of the following : **10**

   1) Draft an e-mail to sportsmanparadise @ yahoo. co. in asking for a trade catalogue.
   2) Explain the significance of audio-visual aids in communication.
   3) Prepare a presentation of 5 slides on the “New software”.

———————