Fourth Semester B.E. Degree Examination, Dec.2013/Jan.2014
Engineering Mathematics – IV

Time: 3 hrs.   Max. Marks:100

Note: *Answer FIVE full questions, selecting at least TWO questions from each part.*

PART – A

1 a. Employ Taylor's series method to obtain the value of y at x = 0.1 and 0.2 for the differential equation $\frac{dy}{dx} = 2y + 3e^x$, y(0) = 0 considering upto fourth degree term. **(06 Marks)**

   b. Determine the value of y when x = 0.1, given that y(0) = 1 and $y'' = x^2 + y^2$ using modified Euler's formula. Take h = 0.05. **(07 Marks)**

   c. Apply Adams-Bashforth method to solve the equation $\frac{dy}{dx} = x^2(1+y)$, given y(1) = 1, y(1.1)= 1.233, y(1.2) = 1.548, y(1.3) = 1.979. Evaluate y(1.4). **(07 Marks)**

2 a. Solve $\frac{dy}{dx} = 1 + zx$, $\frac{dz}{dx} = -xy$, y(0) = 0, z(0) = 1 at x = 0.3 by taking h = 0.3. Applying Runge-Kutta method of fourth order. **(06 Marks)**

   b. Applying Picard's method to compute y(1.1) from the second approximation to the solution of the differential equation $y'' + y^2 y' = x^3$. Given that y(1) = 1, y'(1) = 1. **(07 Marks)**

   c. Using the Mitni's method obtain an approximate solution at the point x = 0.8 of the problem $\frac{d^2y}{dx^2} = 1 - 2y\frac{dy}{dx}$, give that y(0) = 0, y'(0) = 0, y(0.2) = 0.02, y'(0.2) = 0.1996, y(0.4) = 0.0795, y'(0.4) = 0.3937, y(0.6) = 0.1762, y'(0.6) = 0.5689. **(07 Marks)**

3 a. Derive Cauchy-Riemann equations in Cartesian form. **(06 Marks)**

   b. Give u – v (x – y)(x² + 4xy + y²) find the analytic function f(z) = u + iv. **(07 Marks)**

   c. If f(z) = u + iv is an analytic function then prove that $\left(\frac{\partial}{\partial x}|f(z)|\right)^2 + \left(\frac{\partial}{\partial y}|f(z)|\right)^2 = |f'(z)|^2$ **(07 Marks)**

4 a. Find the image of the straight lines parallel to coordinate axes in z-plane under the transformation $w = z^2$. **(06 Marks)**

   b. Find the bilinear transformation which maps the points z = 1, i, –1 on to the points w = 0, 1, ∞. **(07 Marks)**

   c. Evaluate $\int_c \frac{e^{2z}}{(z+1)(z+2)}$, where c is the circle | z | = 3. **(07 Marks)**

PART – B

5 a. Find the solution of the Laplace equation in cylindrical system leading to Besseis differential equation. **(06 Marks)**

   b. If α and β are two distinct roots of $J_n(x) = 0$, then prove that $\int_0^1 x\, J_n(\alpha x)\, J_m(\beta x)\, dx = 0$, $m \neq n$. **(07 Marks)**

   c. Express $f(x) = x^4 - 2x^3 + 3x^2 - 4x + 5$ in terms of legendre polynomial. **(07 Marks)**

6 a. A committee consists of 9 students, 2 from first year, 3 from second year and 4 from third year. 3 students are to be removed at random. What is the probability that (i) 3 students belongs to different class (ii) 2 belongs to the same class and third belongs to different class. (iii) All the 3 belongs to the same class. **(06 Marks)**

   b. State and prove Baye's theorem. **(07 Marks)**

   c. The chance that a doctor will diagnose a disease correctly is 60%. The chance that a patient will die after correct diagnose is 40% and the chance of death after wrong diagnose is 70%. If a patient dies, what is the chance that disease was correctly diagnosed. **(07 Marks)**

7 a. The probability distribution of finite random variable x is given by the following table:

x :	0	1	2	3	4	5	6	7
p(x) :	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2+k$

Find k, $p(x < 6)$, $p(x \geq 6)$, $p(3 < x \leq 6)$ **(06 Marks)**

   b. Obtain the mean and variance of Poisson distribution. **(07 Marks)**

   c. The life of an electric bulb is normally distributed with average life of 2000 hours and standard deviation of 60 hours. Out of 2500 bulbs, find the number of bulbs that are likely to last between 1900 and 2100 hours. Given that $p(0 < z < 1.67) = 0.4525$. **(07 Marks)**

8 a. Explain the following terms:
   i) Null hypothesis   (ii) Type I and Type II error   (iii) Confidence limits. **(06 Marks)**

   b. The weight of workers in a large factory are normally distributed with mean 68 kgs, and standard deviation 3 kgs. If 80 samples consisting of 35 workers each are chosen, how many of 80 samples will have the mean between 67 and 68.25 kgs. Given $p(0 < z < 2) = 0.4772$ and $p(0 \leq z \leq 0.5) = 0.1915$. **(07 Marks)**

   c. Eleven students were given a test in statistics. They were provided additional coaching and then a second test of equal difficulty was held at the end of coaching. Marks scored by then in the two tests are given below.

Test I	23	20	19	21	18	20	18	17	23	16	19
Test II	24	19	22	18	20	22	20	20	23	20	17

Do the marks give evidence that the student have benefited by extra coaching? Given $t_{0.05}(10) = 2.228$. Test the hypothesis at 5% level of significance. **(07 Marks)**

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Fourth Semester B.E. Degree Examination, Dec.2013/Jan.2014
Advanced Mathematics – II

Time: 3 hrs. Max. Marks:100

Note: *Answer any FIVE full questions.*

1 a. Prove that $\sin^2\alpha + \sin^2\beta + \sin^2\gamma = 2$. **(06 Marks)**

   b. If l_1, m_1, n_1 and l_2, m_2, n_2 are direction cosines of two lines then prove that the angle between them is $\cos\theta = l_1 l_2 + m_1 m_2 + n_1 n_2$. **(07 Marks)**

   c. Find the equation of the plane through the interaction of the planes $2x + 3y - z = 5$ and $x - 2y - 3z = -8$, also perpendicular to the plane $x + y - z = 2$. **(07 Marks)**

2 a. Prove that the equation of the plane in the intercept form is $\dfrac{x}{a} + \dfrac{y}{b} + \dfrac{z}{c} = 1$. **(06 Marks)**

   b. Find the equation of the plane through the points $(1, -2, 2)$ $(-3, 1, -2)$ and perpendicular to the plane $2x - y - z + 6 = 0$. **(07 Marks)**

   c. Find the angle between the following lines:
   $$\frac{x-2}{3} = \frac{y-1}{1} = \frac{z-3}{2} \quad \text{and} \quad \frac{x+1}{2} = \frac{y-3}{-1} = \frac{z-1}{0}$$ **(07 Marks)**

3 a. Find the sine of the angle between $\vec{a} = 2\vec{i} - 2\vec{j} + \vec{k}$ and $\vec{b} = \vec{i} - 2\vec{j} + 2\vec{k}$. **(06 Marks)**

   b. Find the value of λ if the vectors $\bar{a} = 4\vec{i} + 6\vec{j} + 2\overline{k}$, $\bar{b} = 3\vec{i} + 10\vec{j} + 5\overline{k}$ and $\bar{c} = -4\vec{i} + 5\vec{j} + \lambda\overline{k}$ are coplanar. **(07 Marks)**

   c. Prove the following:
   i) $(3\bar{a} - 2\bar{b}) \times (4\bar{a} + 2\bar{b}) = 14(\bar{a} + \bar{b})$
   ii) $(2\bar{a} + 3\bar{b}) \times (\bar{a} + 4\bar{b}) = 5(\bar{a} + \bar{b})$ **(07 Marks)**

4 a. A particle moves along the curve $\vec{r} = (t^3 - 4t)\vec{i} + (t^2 + 4t)\vec{j} + (8t^2 - 3t^3)\overline{k}$. Find the velocity and acceleration at $t = 1$ and also find their magnitude. **(06 Marks)**

   b. Find the unit normal vector to the surface $xy^3z^2 = 4$ at the point $(-1, -1, 2)$. **(07 Marks)**

   c. Find the directional derivative of x^2yz^3 at $(1, 1, 1)$ in the direction of $\vec{i} + \vec{j} + 2\overline{k}$ **(07 Marks)**

5 a. Find $\operatorname{div}\vec{F}$ and $\operatorname{curl}\vec{F}$, where $\vec{F} = x^3\vec{i} + y^3\vec{j} + z^3\overline{k}$. **(06 Marks)**

   b. Prove that $\operatorname{curl}\operatorname{grad}\phi = 0$. **(07 Marks)**

   c. Find the constants a, b, c such that the vector $\vec{F} = (x + y + az)\vec{i} + (x + cy + 2z)\overline{k} + (bx + 2y - z)\vec{j}$ is irrotational. **(07 Marks)**

6 Find the Laplace transform of the following:
   a. $\sin 4t \cos 3t$
   b. $\cos hat$
   c. $t\, e^{-t} \sin t$
   d. $\dfrac{1 - \cos t}{t}$ **(20 Marks)**

7   Find the inverse Laplace transform of

a. $\log\left(\dfrac{s+1}{s-1}\right)$ **(06 Marks)**

b. $\dfrac{s+1}{s^2+2s+2}$ **(07 Marks)**

c. $\dfrac{s}{(s+1)(s+2)(s-3)}$ **(07 Marks)**

8   a. By applying Laplce transforms, solve the differential equation $\dfrac{d^5y}{dt^2}+5\dfrac{dy}{dt}+6y=5e^{2t}$ subjected to the conditions $y(0)=y'(0)=0$.   **(10 Marks)**

     b. Solve the simultaneous equations $\dfrac{dx}{dt}+y=\sin t$, $\dfrac{dy}{dt}+x=\cos t$ using Laplace transforms. Given that $x=1$, $y=0$ when $t=0$.   **(10 Marks)**

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Fourth Semester B.E. Degree Examination, Dec. 2013/Jan. 2014
Graph Theory and Combinatorics

Time: 3 hrs.　　　　　　　　　　　　　　　　　　　　　　　Max. Marks:100

Note: *Answer FIVE full questions, selecting*
atleast TWO questions from each part.

PART – A

1　a. Prove that in every graph, the number of vertices of odd degree is even.　**(05 Marks)**
　b. Show that a simple graph of order n = 4 and size m =7 and a complete graph of order n = 4 and size m = 5 do not exist.　**(04 Marks)**
　c. Define isomorphism of two graphs. Show that the two graphs given below are isomorphic.
　　(05 Marks)

Fig. Q1(c)

　d　Discuss Konigsberg bridge problem and the solution of the problem.　**(06 Marks)**

2　a. Show that Kuratowski's first graph, K_5 is non – planar.　**(05 Marks)**
　b. Show that in a complete graph with 'n' vertices where n is an odd number and n ≥ 3, there are $\frac{n-1}{2}$ edge disjont Hamilton cycles.　**(05 Marks)**
　c. Define dual of a planar graph. Draw the geometric dual of the given graph.　**(05 Marks)**
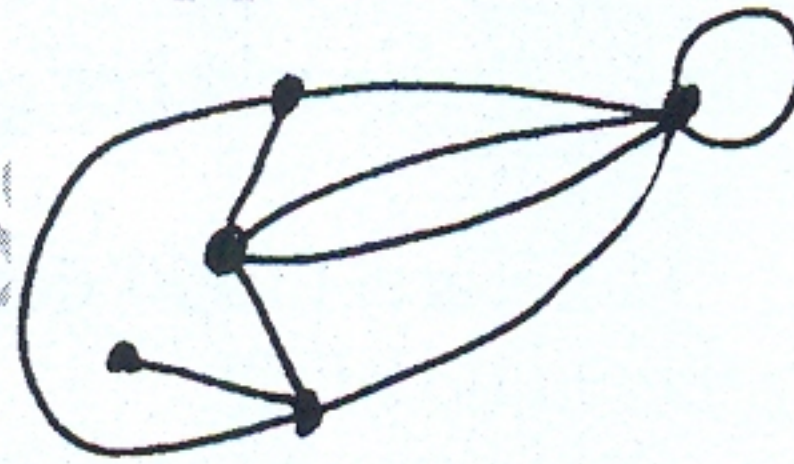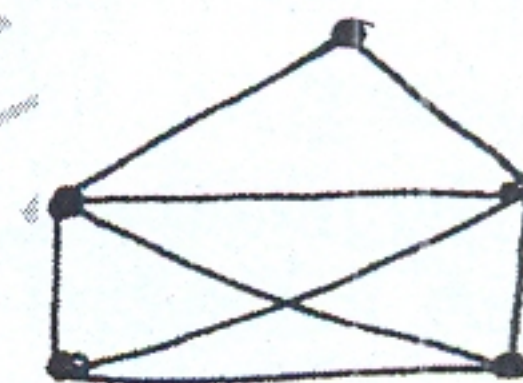

Fig. Q2(c)　　　　　　　　　　　　　　　　Fig. Q2(d)

　d　Define chromatic number. Find P(G, λ) for the Fig. Q2(d).　**(05 Marks)**

3　a. Define a tree. Prove that the tree with P vertices has P – 1 edges.　**(06 Marks)**
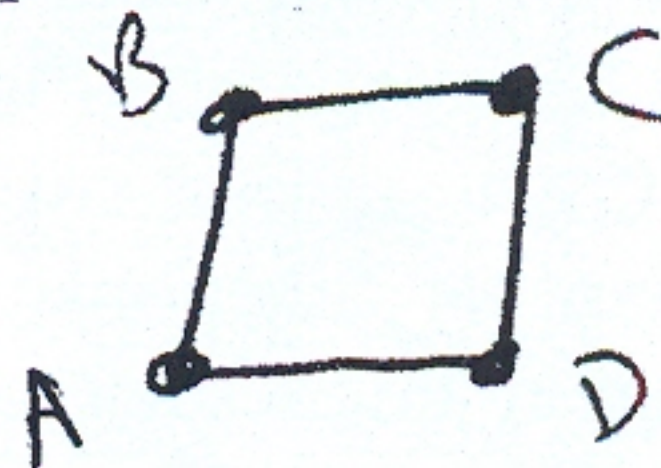　b. Find all the spanning trees of the graph shown below :

Fig. Q3(b)

　　(04 Marks)
　c. Construct an optimal prefix code for the symbols A, B, C, D, E, F, G, H, I, J　that occur with respective frequencies 78, 16, 30, 35, 125, 31, 20, 50, 80, 3.　**(06 Marks)**
　d. If a tree T has four vertices of degree 2, one vertex of degree 3, two vertices of degree 4 and one vertex of degree 5, find the number of leaves in T.　**(04 Marks)**

4 a. Define i) cut set , ii) edge connectivity , iii) bridge connectivity , iv) matching with examples. **(04 Marks)**

   b. Apply Dijkstra's algorithm to the following weighted graph shown in below Fig. Q4(b) and determine the shortest distance from vertex 'a' to each of the other six vertices in the graph. **(06 Marks)**
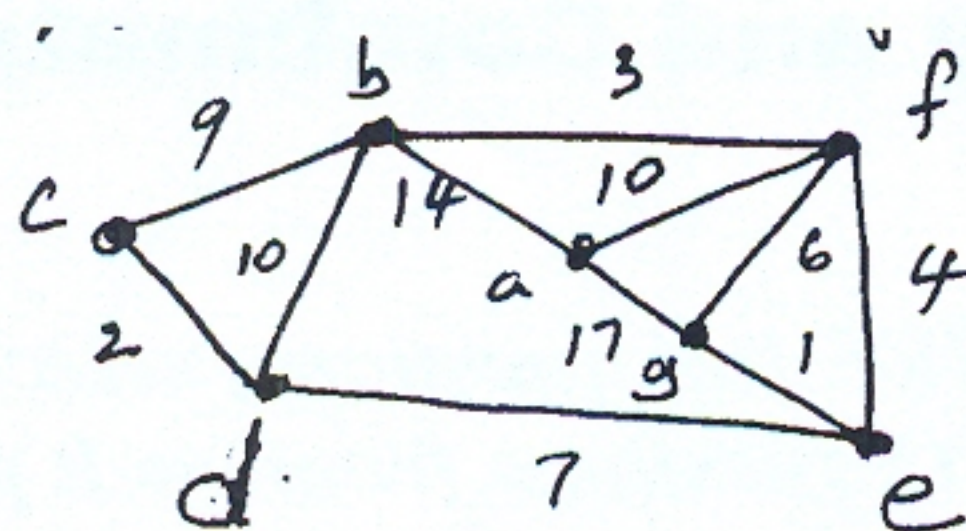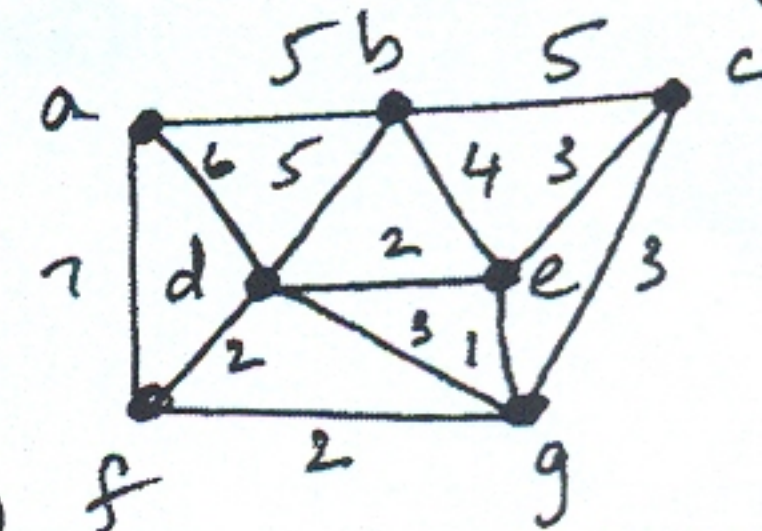

Fig. Q4(b)   Fig. Q4(c)

   c. Using Kruskal's algorithm, find a minimal spanning tree for the weighted graphs shown in Fig. Q4(c). **(05 Marks)**

   d For the network shown in Fig. Q4(d), find the capacities of all the cut-sets between the vertices a and d and hence determine the maximum flow between a and b. **(05 Marks)**
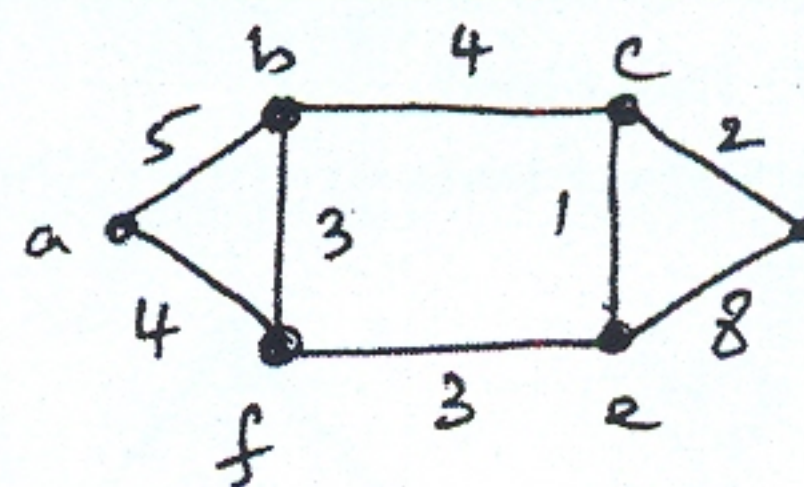

Fig. Q4(d)

PART – B

5 a. A woman has 11 close relatives and she wishes to invite 5 of them to diner. In how many ways can she invite them in the following situations :
   i)   There are no restrictions on the choice
   ii) Two particular persons will not attend separately
   iii) Two particular persons will not attend together. **(06 Marks)**

   b. Find the co-efficient of $x^{11} y^4 z^2$ in the expansion of $(2x^3 - 3xy^2 + z^2)^6$. **(07 Marks)**

   c. Define Catalan numbers. Using the moves : $R(x, y) \to (x + 1, y)$ and $U(x, y) \to (x, y + 1)$ find in how many ways can one go from : i)(0, 0) to (6, 6) and not rise above the line $y = x$ ii) (2, 1) to (7, 6) and not rise above the line $y = x - 1$. **(07 Marks)**

6 a. In how many ways can the 26 letters of the English alphabet be permitted so that none of the patterns CAR, DOG, PUN or BYTE occurs? **(07 Marks)**

   b. For the positive integers 1, 2, 3, …….., n there are 11660 derangements where 1, 2, 3, 4, 5 appear in the first five positions. What is the value of n? **(06 Marks)**

   c. Four persons P_1, P_2, P_3, P_4 who arrive late for a dinner party find that only one chair at each of five tables T_1, T_2, T_3, T_4 and T_5 in vacant. P_1 will not sit at T_1 or T_2, P_2 will not sit at T_2, P_3 will not sit at T_3 or T_4 and P_4 will not sit at T_4 or T_5. Find the number of ways they can occupy the vacant chairs. **(07 Marks)**

7 a. Find the generating function for the sequence 0, 2, 6, 12, 20, 30, 42, …….. **(07 Marks)**

   b. In how many ways can 12 oranges be distributed among three children A, B, C so that A gets at least four, B and C get out least two, but C gets no more than five? **(06 Marks)**

   c. Define exponential generating functions. Find the exponential generating function for the number of ways to arrange n letters selected from MISSISSIPPI. **(07 Marks)**

8 a. Find the recurrence relation and the initial condition for the sequence 2, 10, 50, 250, ……. Hence find the general term of the sequence. **(06 Marks)**

   b. Solve the recurrence relation $a_n + a_{n-1} - 6a_{n-2} = 0$ for $n \geq 2$ given that $a_0 = -1$ and $a_1 = 8$. **(07 Marks)**

   c. Using the generating function solve the recurrence relation $a_n - 3a_{n-1} = n$, $n \geq 1$ given $a_0 = 1$. **(07 Marks)**

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Fourth Semester B.E. Degree Examination, Dec. 2013/Jan. 2014
Design and Analysis of Algorithms

Time: 3 hrs. Max. Marks:100

Note: *Answer FIVE full questions, selecting*
atleast TWO questions from each part.

PART – A

1 a. With the help of a flow chart, explain the various steps of algorithm design and analysis process. **(08 Marks)**

   b. If $f_1(n) \in O(g_1(n))$ and $f_2(n) \in O(g_2(n))$ prove that $f_1(n) + f_2(n) \in O(\max \{g(n), g_2(n)\})$. **(04 Marks)**

   c. Write an algorithm for selection sort and show that the time complexity of this algorithm is quadratic. **(08 Marks)**

2 a. What is divide and conquer method. Show that the worst case efficiency of binary search algorithm is $\theta(\log n)$. **(10 Marks)**

   b. Explain quick sort algorithm. Find the time complexity of quick sort for best case, worst case and average case. **(10 Marks)**

3 a. Write Krushal's algorithm to construct a minimum spanning tree and show that the time efficiency is $O(|\in|\log|\in|)$. **(08 Marks)**

   b. Apply Kruskal's algorithm to find the min spanning tree of the graph. **(08 Marks)**
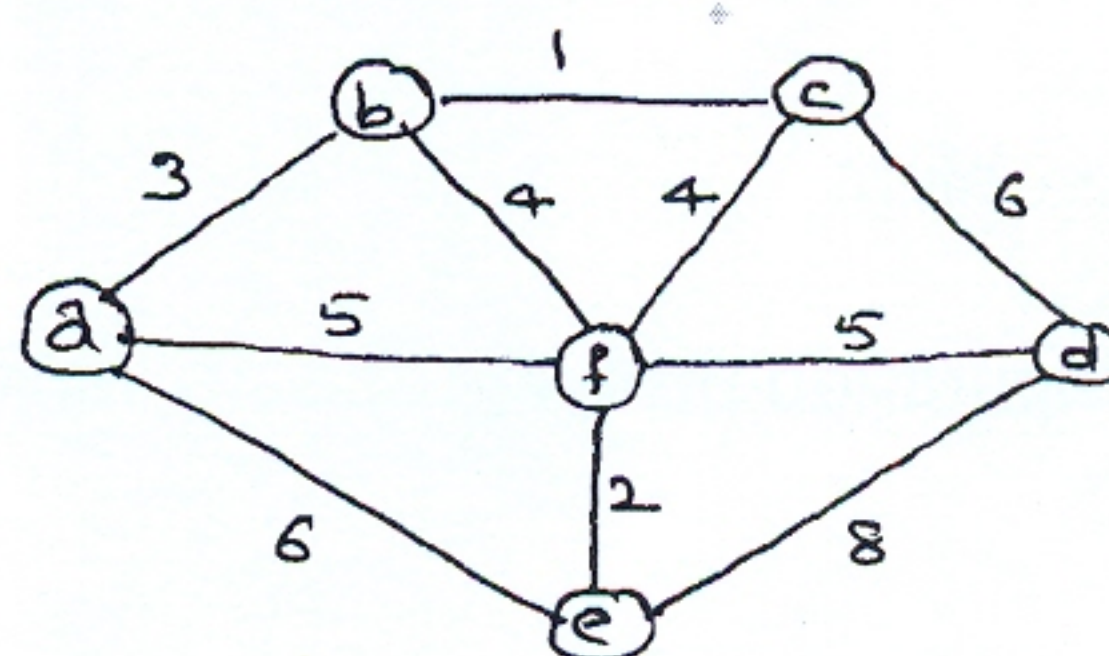

Fig. Q3(b)

   c. Write Dijikstra's algorithm to find single source shortest path. **(04 Marks)**

4 a. Write the dynamic programming algorithm to compute binomial co-efficient and obtain its time complexity. **(04 Marks)**

   b. Explain Warshall algorithm to find the transitive closure of a directed graph. Apply this algorithm to the graph given below. **(08 Marks)**
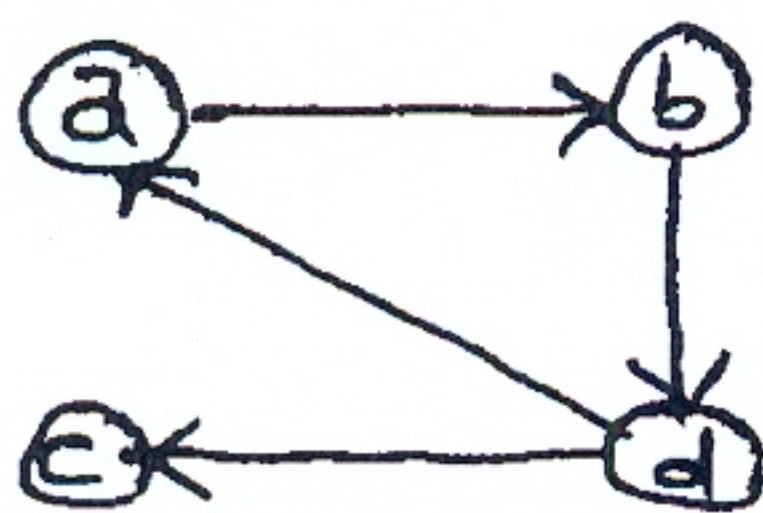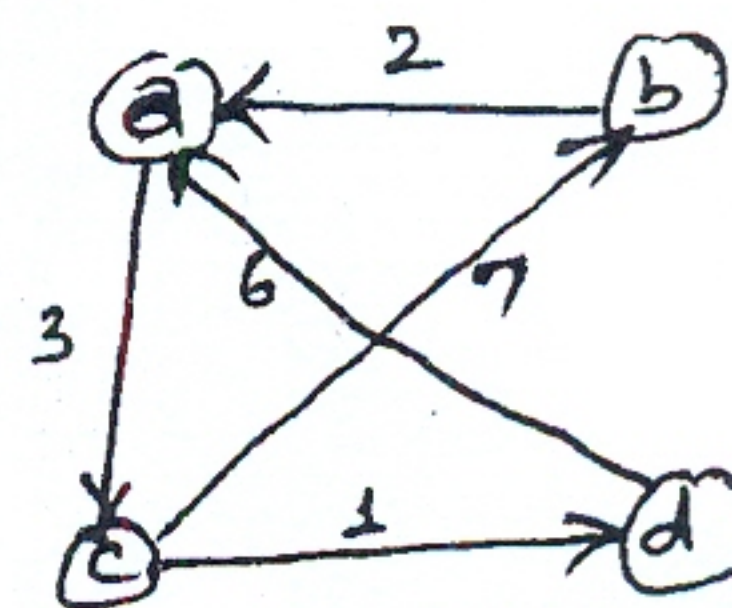

Fig. Q4(b)

Fig. Q4(c)

   c. State Floyd's algorithm. Solve all pairs shortest path problem for the given graph using Floyd algorithm. **(08 Marks)**

PART – B

5 a. Explain decrease and conquer method, with a suitable example. **(04 Marks)**
   b. Apply the DFS – based algorithm to solve the topological sorting problem for given graph.
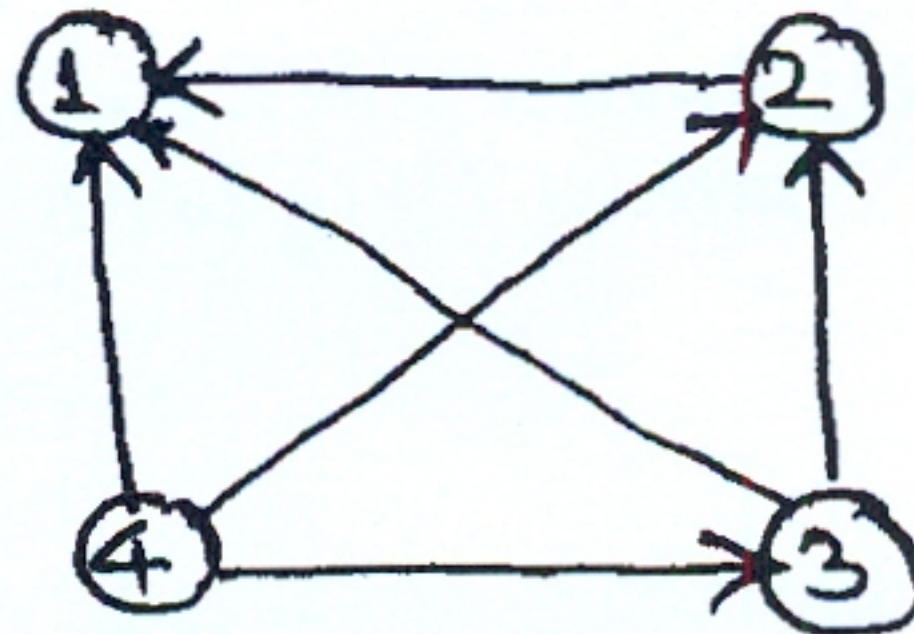   **(08 Marks)**

Fig. Q5(b)

   c. State Horspool's algorithm for pattern matching. Apply the same to search for the pattern BARBER in a given text. **(08 Marks)**

6 a. Prove that the classic recursive algorithm for the tower of Hanoi puzzle makes the minimum number of disks moves needed to solve it. **(08 Marks)**
   b. Write short notes on :
      i) Tight lower bound
      ii) Trivial lower bound
      iii) Information theoretic lower bound. **(12 Marks)**

7 a. Explain how the TSP problem can be solved, using branch and bound method. **(06 Marks)**
   b. Explain back-tracking concept and apply the same to n-queens problem. **(08 Marks)**
   c. Solve 8 – queens problem for a feasible sequence (6, 4, 7, 1). **(06 Marks)**

8 a. Write short notes on :
      i) Hamiltonian problem
      ii) M – Coloring. **(10 Marks)**
   b. Explain prefix computation problem and list ranking algorithm, with suitable examples.
      (10 Marks)

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10CS44

Fourth Semester B.E. Degree Examination, Dec.2013/Jan.2014
UNIX and Shell Programming

Time: 3 hrs.

Max. Marks:100

Note: *Answer FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1   a. Describe briefly the major features of the UNIX operating system. **(08 Marks)**
    b. Define a file. With examples, explain the three categories of files supported by UNIX. **(06 Marks)**
    c. Briefly describe:
       i) System calls   ii) PATH   iii) HOME. **(06 Marks)**

2   a. Explain the significance of all the fields of *ls –l* output. Which of the attributes can be changed only by the super user? **(08 Marks)**
    b. With a neat diagram, explain the three modes of vi editor. **(06 Marks)**
    c. Assuming that a file's current permissions are rw – r – x r – –, specify the chmod expression (using both relative and absolute methods) required to change them to:
       i)   rwx rwx rwx
       ii) r – – r – – – – –
       iii) – – – r – – r – – **(06 Marks)**

3   a. Devise wild – card patterns to match filenames:
       i)   Comprising of atleast three characters where the first char is numeric and the last char is not alphabetic.
       ii) With three character extensions except the ones with .log extension.
       iii) Containing 2004 as an embedded string except at the beginning or end. **(06 Marks)**
    b. Explain the three distinct phases of process creation. How is the shell created? **(08 Marks)**
    c. What are environment variables? Briefly describe any five of them. **(06 Marks)**

4   a. Distinguish between hard links and symbolic links with suitable examples. **(08 Marks)**
    b. Describe the sort filter and illustrate its usage with –k, –u, –n, –r and –c options. **(06 Marks)**
    c. i)   Use find to locate all files named a.out and all C source files in your home directory tree and remove them interactively.
       ii) Display only the names of all users who are logged in and also store the result in users.txt.
       iii) Invoke the vi editor with the last modified file. **(06 Marks)**

PART – B

5   a. Explain with suitable examples, the sed filter along with its two forms of addressing. Also describe in brief the substitution feature provided by sed. **(08 Marks)**
    b. Describe the grep filter along with any five options. **(06 Marks)**
    c. i)   Use sed to delete all blank lines from a file named sample.
       ii) Use grep to list only the sub-directories in the current directory.
       iii) Replace all occurrences of the word "UNIX" with "LINUX" in a file named sample.
       (06 Marks)

6 a. Define a shell script. What are the two ways of running a shell script? Write a shell script to accept pattern and a file and search for the pattern in the file. **(08 Marks)**
   b. Explain the shell's for loop giving the possible sources of the list. **(06 Marks)**
   c. Write a menu-driven shell script to perform the following:
       i)   List of users who are logged in.
       ii) List of files in the current directory.
       iii) List of processes of user.
       iv) Today's date.
       v)   Quit to UNIX. **(06 Marks)**

7 a. Describe the awk filter with syntax and example. How are awk arrays different from the ones used in most programming languages? **(08 Marks)**
   b. Explain the looping constructs supported by awk. **(06 Marks)**
   c. Briefly describe the built-in functions supported by awk for arithmetic and string operations. **(06 Marks)**

8 a. With examples, explain the string handling functions supported by perl. **(08 Marks)**
   b. How are split and join used in perl scripts? **(06 Marks)**
   c. Write a perl script to determine whether a year is leap year or not. **(06 Marks)**

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Fourth Semester B.E. Degree Examination, Dec.2013/Jan.2014
Microprocessors

Time: 3 hrs.   Max. Marks:100

Note: *Answer FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1   a.   Explain the memory structure of Intel personal computer in detail with neat schematic.   **(08 Marks)**
    b.   Briefly explain various multipurpose registers in 8086.   **(06 Marks)**
    c.   What is real mode addressing? Explain default segment and offset registers.   **(06 Marks)**

2   a.   Illustrate the memory paging mechanism in the 80386 microprocessor with suitable schematic.   **(06 Marks)**
    b.   Briefly explain various addressing modes of 8086 with suitable examples.   **(10 Marks)**
    c.   What do the following MOV instructions accomplish?
            MOV RAX, RCX
            MOV ESP, [BSP]
            MOV AX, 2341H
            MOV CS, AX   **(04 Marks)**

3   a.   Write and explain machine code for instruction MOV DL, [BX]   **(10 Marks)**
    b.   Describe the operation of each of the following instruction in brief:
      ·PUSHF   ·MOVS   ·LAHF   ·DIV   ·XCHG   **(05 Marks)**
    c.   What is segment override prefix? Illustrate the same with an example.   **(05 Marks)**

4   a.   Explain with an example how multiple if then else statement can be implemented using ALP.   **(10 Marks)**
    b.   Differentiate between short, near and far jump instructions with two examples of each.   **(10 Marks)**

PART – B

5   a.   Illustrate a simple program that uses a character string defined with and display on a separate line.   **(10 Marks)**
    b.   Differentiate between:
      (i) Assembler and linker   (ii) Public and EXTRN   (iii) Macros and Procedure.   **(06 Marks)**
    c.   Write an ALP to compute factorial of single digit positive number using recursive procedure.   **(04 Marks)**

6   a.   Explain minimum mode PINS of 8086 and minimum mode configuration of 8086 with neat diagram.   **(10 Marks)**
    b.   Describe internal block diagram of 8288 Bus controller with explanation of each pins.   **(06 Marks)**
    c.   With neat timing diagram, explain the I/O read operation.   **(04 Marks)**

7   a.   With neat diagram, explain simple NAND gate address decoding logic.   **(10 Marks)**
    b.   Differentiate between Memory mapped I/O and direct I/O.   **(05 Marks)**
    c.   Briefly explain handshaking or polling with necessary diagrams.   **(05 Marks)**

8   a.   Explain pin-out of 82C55 along with different operational modes.   **(10 Marks)**
    b.   Explain the structure of 8086 interrupt vector table with a neat diagram.   **(10 Marks)**

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Fourth Semester B.E. Degree Examination, Dec.2013/Jan.2014
Computer Organization

Time: 3 hrs.   Max. Marks:100

Note: *Answer FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1   a. Explain with necessary block diagram the basic functional unit of a computer.   **(10 Marks)**
    b. Explain in detail the generation of computers.   **(10 Marks)**

2   a. Big-Endian and Little-Endian assignments, explain with necessary figure.   **(05 Marks)**
    b. List the name, assembler syntax and addressing functions for the different addressing modes.   **(10 Marks)**
    c. Explain logical and arithmetic shift instructions with an example.   **(05 Marks)**

3   a. Draw the arrangement of a single bus structure and brief about memory mapped I/O.   **(05 Marks)**
    b. Explain: i) Interrupt enabling; ii) Interrupt disabling; iii) Edge triggering, with respect interrupts.   **(10 Marks)**
    c. Draw the arrangement for bus arbitration using a daisy chain and explain in brief.   **(05 Marks)**

4   a. Draw the hardware components needed for connecting a keyboard to a process and explain in brief.   **(10 Marks)**
    b. Explain the use of PCI bas in a computer system with necessary figure.   **(05 Marks)**
    c. List the SCSI bus signals with their functionalities.   **(05 Marks)**

PART – B

5   a. Draw for $1K \times 1$ memory chip with neat figure.   **(10 Marks)**
    b. Show with diagram the memory hierarchy with respect to speed, size and cost.   **(05 Marks)**
    c. With figure explain about direct mapping cache memory.   **(05 Marks)**

6   a. Explain with figure the design of a 4-bit carry look ahead adder.   **(10 Marks)**
    b. With figure explain circuit arrangements for binary division.   **(05 Marks)**
    c. IEEE standard for floating point numbers, explain.   **(05 Marks)**

7   a. Draw and explain the single-bus organization of the data path inside a processor.   **(10 Marks)**
    b. Write the control sequence for an un-conditional branch instruction.   **(05 Marks)**
    c. Draw the block diagram of the control unit organization and describe in brief.   **(05 Marks)**

8   a. Explain in brief about multiprocessor systems.   **(05 Marks)**
    b. Explain about memory organization in multiprocessors.   **(10 Marks)**
    c. What are the classifications of parallel processing?   **(05 Marks)**

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