USN | | | | | | | | | | | **06MAT31**

Third Semester B.E. Degree Examination, Dec. 07 / Jan. 08

Engineering Mathematics - III

Time: 3 hrs. Max. Marks:100

Note : *Answer any FIVE full questions choosing at least TWO from each part.*

Part A

1 a. Find the Fourier series for the function $f(x)=x+x^2$ from $x=-\pi$ to $x=\pi$ and deduce that $\frac{\pi^2}{8}=\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+.........$ **(07 Marks)**

b. Obtain the cosine half-range Fourier series for $f(x)=Kx,$ in $0\le x\le l/2$; $=K(l-x)$ in $l/2\le x\le l$. **(07 Marks)**

c. The following table gives the variating of periodic current over a period:

t (sec)	0	$T/6$	$T/3$	$T/2$	$2T/3$	$5T/6$	T
A (Amp)	1.98	1.30	1.05	1.30	-0.88	-0.25	1.98

Show that there is a direct current part of 0.75 amp in the variable current and obtain the amplitude of the first harmonic. **(06 Marks)**

2 a. Obtain the finite Fourier Cosine transform of the function $f(x)=e^{ax}$ in (0, l). **(07 Marks)**

b. Find the Fourier sine and cosine transforms of

$$f(x)=\begin{cases}x, & 0<x<2\\ 0, & \text{otherwise}\end{cases}.$$ **(07 Marks)**

c. Solve the integral equation,

$$\int_0^\infty f(x)\cos(\alpha x)dx=\begin{cases}1-\alpha, & 0\le\alpha\le1\\ 0, & \alpha>1\end{cases}.$$

Hence evaluate $\int_0^\infty \frac{1-\cos x}{x^2}dx$. **(06 Marks)**

3 a. Form the P.D.E by eliminating the arbitrary function from $z=y^2+2f\left(\frac{1}{x}+\log y\right)$. **(07 Marks)**

b. Solve $x^2\frac{\partial u}{\partial x}+y^2\frac{\partial u}{\partial y}=0$ by the method of separation of variables. **(07 Marks)**

c. Solve $(y^2+z^2)p+x(yq-z)=0$. **(06 Marks)**

4 a. Derive the one dimensional heat equation. **(07 Marks)**

b. Solve the wave equation $\frac{\partial^2 u}{\partial t^2}=C^2\frac{\partial^2 u}{\partial x^2}$ given $u(0,t)=0$; $u(l,t)=0$; $\frac{\partial u}{\partial t}=0$ when $t=0$ and $u(x,0)=u_0\sin\frac{\pi x}{l}$. **(07 Marks)**

c. Obtain the various possible solutions of the Laplace's equation $u_{xx}+u_{yy}=0$ by the method of separation of variables. **(06 Marks)**

Part B

5 a. Find the real root of the equation $3x = \cos x + 1$ correct to four decimal places using Newton's method. **(07 Marks)**

b. Solve the system of equations,

$$2x + y + z = 10$$
$$3x + 2y + 3z = 18$$
$$x + 4y + 9z = 16$$

by Gauss-Jordan method. **(07 Marks)**

c. Find the largest eigen value and the corresponding eigen vector of the following matrix by using power method.

$$A = \begin{bmatrix} 2 & 0 & 1 \\ 0 & 2 & 0 \\ 1 & 0 & 2 \end{bmatrix}$$

Taking $[1 \quad 0 \quad 0]^T$ as the initial eigen vector. Carry out four iterations. **(06 Marks)**

6 a. Given f(0) = 1, f(1) = 3, f(2) = 7, f(3) = 13. Find f(0.1) and f(2.9) using Newton Interpolation formula. **(07 Marks)**

b. Using Newton's divided difference formula evaluate f(8) and f(15), given that **(07 Marks)**

x	4	5	7	10	11	13
f(x)	48	100	294	900	1210	2028

c. Evaluate $\int_{4}^{5.2} \log_e x dx$ by using Weddle's rule, taking 7 ordinates. **(06 Marks)**

7 a. Derive the Euler's equation in the form $\frac{\partial f}{\partial y} - \frac{d}{dx}\left(\frac{\partial f}{\partial y'}\right) = 0$. **(07 Marks)**

b. Find the extremal of the functional $\int_{0}^{\pi/2} \left[y^2 - (y')^2 - 2y\sin x\right]dx$ under the conditions $y(0) = y(\pi/2) = 0$. **(07 Marks)**

c. Find the geodesics on a surface, given that the arc length on the surface is $s = \int_{x_1}^{x_2} \sqrt{x\left[1 + (y')^2\right]}\,dx$. **(06 Marks)**

8 a. Find the z-transforms of i) $(n+1)^2$ ii) sin(3n+5). **(07 Marks)**

b. Obtain the inverse Z transform of $\frac{2z^2 + 3z}{(z+2)(z-4)}$. **(07 Marks)**

c. Solve the difference equation,

$y_{n+2} + 6y_{n+1} + 9y_n = 2^n$ with $y_0 = y_1 = 0$ using Z transforms. **(06 Marks)**

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MATDIP301

Third Semester B.E. Degree Examination, Dec. 07 / Jan. 08

Advanced Mathematics – I

Time: 3 hrs.

Max. Marks:100

Note : *Answer any FIVE full questions.*

1 a. Find the n^{th} derivative of – i) $\cos(ax+b)$ ii) $\log(ax+b)$. **(06 Marks)**

b. Find the n^{th} derivative of $\frac{x}{(2x+1)(x+3)}$. **(07 Marks)**

c. If $y=\tan^{-1}x$ prove that : $(1+x^2)y_{n+2}+2(n+1)xy_{n+1}+n(n+1)y_n=0$. **(07 Marks)**

2 a. With usual notation prove that $\tan\phi = r\frac{d\theta}{dr}$. **(06 Marks)**

b. Find the angle between the pairs of curves : $r=6\cos\theta$ $r=2(1+\cos\theta)$. **(07 Marks)**

c. Obtain Maclaurin's series expansion of the function $e^x\sin x$ up to the term containing x^4. **(07 Marks)**

3 a. If $u=\phi(x+ay)+\Psi(x-ay)$, prove that $\frac{\partial^2u}{\partial y^2}=a^2\frac{\partial^2u}{\partial x^2}$. **(07 Marks)**

b. Verify Euler's theorem for the function: $u=x\tan^{-1}\left(\frac{y}{x}\right)$. **(06 Marks)**

c. If $x=r\cos\theta$, $y=r\sin\theta$ find $\frac{\partial(r,\theta)}{\partial(x,y)}$ in terms of r. **(07 Marks)**

4 a. Find the reduction formula for $\int\sin^n x\,dx$. **(06 Marks)**

b. Find the value of $\int_0^1\left(\frac{x^4}{\sqrt{4-x^2}}dx\right)$. **(07 Marks)**

c. Evaluate $\int_0^1\int_{x^2}^{x}(x^2+3y+2)dydx$. **(07 Marks)**

5 a. Prove that $\Gamma\left(\frac{1}{2}\right)=\sqrt{\pi}$. **(06 Marks)**

b. Prove that $\beta(m,n)=2\int_0^{\pi/2}\sin^{2m-1}\theta\cos^{2n-1}\theta\,d\theta$ and hence evaluate $\int_0^{\pi/2}\sqrt{\tan x}\,dx$. **(07 Marks)**

c. Prove that $\int_0^\infty\sqrt{x}e^{-x^2}dx \times \int_0^\infty\frac{e^{-x^2}}{\sqrt{x}}dx=\frac{\pi}{2\sqrt{2}}$. **(07 Marks)**

6 a. Solve $(4x+y+1)^2=\frac{dy}{dx}$ **(06 Marks)**

b. Solve $x^2ydx-(x^3+y^3)dy=0$. **(07 Marks)**

c. Solve $\frac{dy}{dx}=e^{x-y}(e^x-e^y)$. **(07 Marks)**

7 a. Solve $\frac{d^3y}{dx^3}-6\frac{d^2y}{dx^2}+11\frac{dy}{dx}-6y=0$. **(06 Marks)**

b. Solve $\frac{d^{2y}}{dx^2}+4\frac{dy}{dx}+5y=2\cosh x$. **(07 Marks)**

c. Solve $\frac{d^2x}{dx^2}-3\frac{dy}{dx}+2y=\cos 2x$. **(07 Marks)**

8 a. Find the modulus and amplitude of $(1-\cos\alpha+i\sin\alpha)$. **(06 Marks)**

b. Prove that $(1+\cos\theta+i\sin\theta)^n+(1+\cos\theta-i\sin\theta)^n=2^{n+1}\cos^n\frac{\theta}{2}\cos\frac{n\theta}{2}$. **(07 Marks)**

c. Prove that $\sin^7\theta=-\frac{1}{64}(\sin7\theta-7\sin5\theta+21\sin3\theta-35\sin\theta)$. **(07 Marks)**

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Third Semester B.E. Degree Examination, Dec. 07 / Jan. 08
Electronic Circuits

Time: 3 hrs. Max. Marks:100

Note : *Answer any FIVE full questions.*

1 a. Sketch and explain the circuits of a combination clipper which limit the output between ± 10 V. Assume the diode voltage is 0.7 V. **(08 Marks)**

b. With neat diagram and waveforms explain the working of a negative clamper and also write the condition for stiff clamper. **(08 Marks)**

c. Explain how charge storage is overcome in Schottky diodes. **(04 Marks)**

2 a. Explain small signal operation of amplifiers **(06 Marks)**

b. What is the significance of ac emitter resistance in common emitter amplifier? **(04 Marks)**

c. Calculate the input impedance of the base in Fig. Q 2(c) with $\beta = 150$ also draw the ac equivalent circuit using π model. **(10 Marks)**

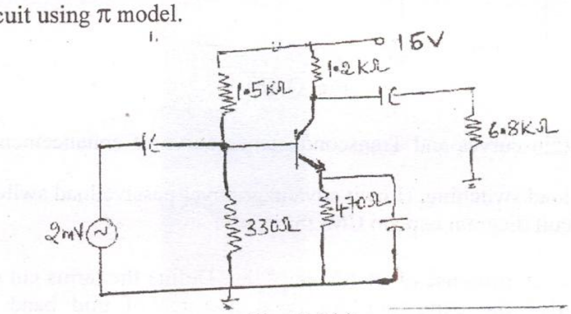

Fig. Q 2(c)

3 a. With a neat sketch explain the working of a swamped amplifier and derive the expressions for voltage gain and input impedance of the base. **(10 Marks)**

b. Calculate the output impedance of the amplifier in Fig. Q 3(b). **(06 Marks)**

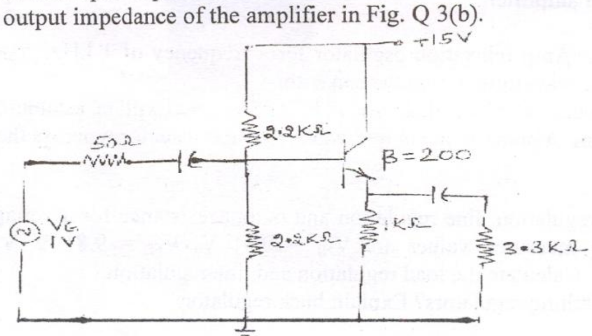

Fig. Q 3(b)

c. Write a note on complementary Darlington pair. **(04 Marks)**

4 a. Explain the working of class B push pull emitter follower. Draw its DC and AC load lines. **(10 Marks)**

b. Calculate the efficiency and transistor power dissipation of the class A amplifier shown in Fig. Q 4(b) if the peak to peak output voltage is 18 V and input impedance of the base is 100Ω.

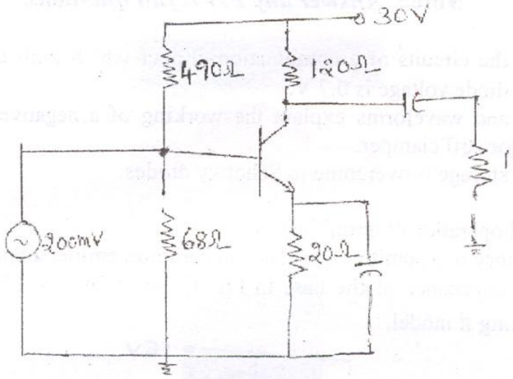

Fig. Q4(b) **(10 Marks)**

5 a. Describe the drain curves and Transconductance curve of enhancement mode MOSFET. **(08 Marks)**

b. Explain active load switching. How it advantages over passive load switching? **(06 Marks)**

c. With a neat circuit diagram explain CMOS inverter. **(06 Marks)**

6 a. Draw the frequency response of an AC amplifier. Define the terms cut off frequency, mid band gain. Derive the expression for gain in terms of mid band gain and cut off frequencies. **(06 Marks)**

b. OP Amp 74 IC has a mid band gain of 100,000, lower cut off frequency of 10 Hz and roll of rate 20 dB per decade. What is the voltage gain at 10 kHz? **(06 Marks)**

c. Explain ICVS amplifier. **(08 Marks)**

7 a. Design an OP Amp relaxation oscillator for a frequency of 1 kHz. Also draw the output waveform and waveform across the capacitor. **(10 Marks)**

b. Write the functional block diagram of IC 555 timer. Explain astable operation with the circuit diagram. Also draw the output waveform and waveform across the capacitor. **(10 Marks)**

8 a. Define load regulation, line regulation and output resistance for a voltage regulator. For a regulator the measured values are V_{NL} = 9.91 V, V_{FL} = 9.81 V, V_{HL} = 9.94 V and V_{LL} = 9.79 V. Calculate the load regulation and line regulation. **(10 Marks)**

b. What are switching regulators? Explain buck regulator. **(10 Marks)**

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Third Semester B.E Degree Examination, Dec. 07 / Jan. 08

Logic Design

Time: 3 hrs. Max. Marks:100

Note : ***Answer any FIVE full questions choosing at least TWO questions from each part..***

PART – A

1 a. Using Karnaugh map simplify the following Boolean expression and give the implementation of the same using :
i) NAND gates only (SOP form) ii) NOR gates only (POS form)
$f(A, B, C, D) = \sum m\ (0, 1, 2, 4, 5, 12, 14) + dc\ (8, 10)$. **(08 Marks)**

b. Find the prime implicantes for the Boolean expression using Quine Mc Clusky's method.
$F (w, X, Y, Z) = \sum m\ (1, 3, 6, 7, 8, 9, 10, 12, 13, 14)$. **(10 Marks)**

c. Explain the principle of duality. **(02 Marks)**

2 a. Realize the Boolean expression $f(w, x, y, z) = \sum m(4, 6, 7, 8, 10, 12, 15)$ using a 4 to 1 line multiplexer and external gates. **(08 Marks)**

b. Design a 1-bit comparator using basic gates. **(05 Marks)**

c. Implement the following Boolean functions using an appropriate PLA.
$F1(A, B, C) = \sum m(0, 4, 7)$; $F2 (A, B, C) = \sum m(4, 6)$. **(04 Marks)**

d. What are the three different models for writing a module body in Verilog HDL. Give an example for any one model. **(03 Marks)**

3 a. Explain with example the 2's complement arithmetic using all the cases. **(04 Marks)**

b. Draw a block diagram of a 4 – bit adder – subtract circuit using full adder and give a brief description. **(04 Marks)**

c. Design a 2-bit fast adder. Give its implementation using gates. **(08 Marks)**

d. Write a HDL code for a full adder. **(04 Marks)**

4 a. Write the characteristic of an ideal clock. **(06 Marks)**

b. With the help of a block diagram, explain the working of a JK Master – Slave flip – flop. **(08 Marks)**

c. Show how a SR flip – flop can be converted to a JK flip – flop. **(06 Marks)**

PART – B

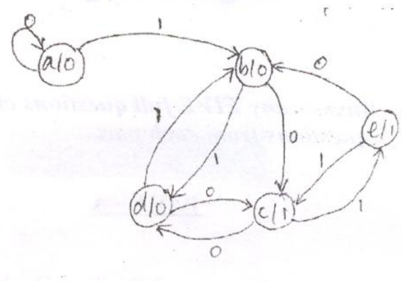
5 a. Distinguish between a ring counter and a Johnson counter. **(04 Marks)**

b. Explain the working of a 3-bit asynchronous down counter. **(06 Marks)**

c. Design a synchronous mod – 5 up counter using JK flip – flop. Give excitation table of JK flip – flop, state diagram and state table. **(10 Marks)**

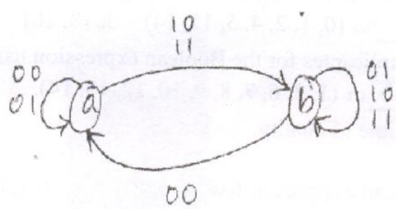
6 a. Explain the difference between Mealy and Moore models. **(04 Marks)**

b. Reduce the state transition diagram by row elimination method and implication table method.



(10 Marks)

c. Design an asynchronous sequential logic circuit for the state transition diagram shown. **(06 Marks)**



7 a. Draw a 4-bit D/A converter using R/2R resistors and explain its working. **(10 Marks)**

b. Explain the A/D converter by simultaneous conversion. Draw the block diagram of a 2 – bit simultaneous A/D converter. **(10 Marks)**

8 a. With the aid of a circuit diagram, explain the operation of a 2 – input TTL NAND gate with totem – pole output. **(08 Marks)**

b. Explain the operation of a 2 – input CMOS NOR gate with a help of a circuit diagram. **(06 Marks)**

c. Write a note on the CMOS characteristics. **(06 Marks)**

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Third Semester B.E. Degree Examination, Dec. 07 / Jan. 08

Discrete Mathematical Structures

Time: 3 hrs. Max. Marks:100

Note : *Answer any FIVE full questions.*

1 a. Using Venn diagram, prove that, for any sets A, B and C $\overline{\{(A \cup B) \cap C\}} \cup \overline{B} = \overline{B \cap C}$. **(05 Marks)**

b. State and prove De Morgan's Laws of set theory. **(04 Marks)**

c. In a survey of 260 college students, the following data were obtained:
64 had taken a mathematics course, 94 had taken a computer science course, 58 had taken a business course, 28 had taken both a mathematics and a business course, 26 had taken both a mathematics and a computer science course, 22 had taken both a computer science and a business course, and 14 had taken all three types of courses.
i) How many of these students had taken none of the three courses?
ii) How many had taken only a computer science courses? **(06 Marks)**

d. Prove, by mathematical induction $1.3 + 2.4 + 3.5 + ...n(n+2) = \frac{n(n+1)(2n+7)}{6}$. **(05 Marks)**

2 a. If statement q has the truth value 1, determine all truth value assignments for the primitive statements p, r and s for which the truth value of the statement:
$(q \to [(\neg p \vee r) \wedge \neg s]) \wedge [\neg s \to (\neg r \wedge q)]$ is 1. **(04 Marks)**

b. Define tautology. Show that $[(p \vee q) \wedge (p \to r) \wedge (q \to r)] \to r$ is a tautology by constructing truth table. **(05 Marks)**

c. Simplify the compound statement $\neg[\neg((p \vee q) \wedge r) \vee \neg q]$ using laws of logic. Mention the reasons. **(05 Marks)**

d. Write the following argument in symbolic form and then establish its validity:
If Rochelle gets the supervisor's position and works hard, then she'll get a raise. If she gets the raise, then she'll buy a new car. She has not purchased a new car. Therefore, either Rochelle did not get the supervisor's position or she did not work hard. **(06 Marks)**

3 a. Define an open statement. Write the negation of the statement: If k, m, n are any integers where k – m and m – n are odd then k – n is even. **(07 Marks)**

b. For the universe of all integers, define the following open statements:
p(x): x>0, q(x): x is even, r(x): x is a perfect square, s(x): x is divisible by 4 and t(x): x is divisible by 5.
Write the following statements in symbolic form and determine whether each of the statements is true or false. For each false statement, provide a counter example.
i) Atleast one integer is even ii) There exists a positive integer that is even iii) If x is even, then x is not divisible by 5 iv) If x is even and x is a perfect square, then x is divisible by 4. **(07 Marks)**

c. Give: i) A direct proof, ii) An indirect proof and iii) Proof by contradiction, for the following statement, "If n is an odd integer, then n+9 is an integer". **(06 Marks)**

4 a. Let A = {1, 2, 3, 4, 6} and 'R' be a relation on 'A' defined by aRb if and only if 'a' is multiple of 'b': i) Write down R as a set of ordered pairs ii) Represent R as a matrix iii) Draw the digraph of R. **(06 Marks)**

b. Let A = {1, 2, 3, 4, 5} × {1, 2, 3, 4, 5}, and define R on A by
$(x_1, y_1)R(x_2, y_2)$ if $x_1 + y_1 = x_2 + y_2$.
i) Verify that R is an equivalence relation on A.
ii) Determine the equivalence classes [(1, 3)], [(2, 4)] and [(1, 1)]. **(08 Marks)**

c. Define a poset. Consider the Hasse diagram of a poset (A, R) given below in fig.Q4(c). If B = {c, d, e}, find (if they exist).
i) The least upper bound of B ii) The greatest lower bound of B. **(06 Marks)**

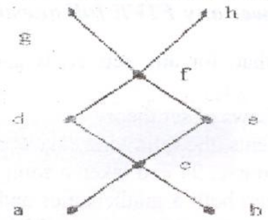

Fig.Q4(c)

5 a. Let S = {-1, 0, 2, 4, 7}. Find f(S) if i) f(x) = 1, ii) f(x) = 2x+1, iii) $f(x)=\left\lceil \frac{x}{5} \right\rceil$,
iv) $f(x)=\left\lfloor \frac{(x^2+1)}{3} \right\rfloor$. **(06 Marks)**

b. Let A = {1, 2, 3, 4} and B = {1, 2, 3, 4, 5, 6}
i) How many functions are there from A to B? How many of these are one-to-one? How many are onto?
ii) How many functions are there from B to A? How many of these are onto? How many are one-to-one? **(06 Marks)**

c. Let A = B = R. Determine $\pi_A(D)$ and $\pi_B(D)$ for each of the following sets $D \subseteq A \times B$.
i) D = {(x, y)/x = y^2, $0 \le y \le 2$} ii) D = {(x, y)/y = Sinx, $0 \le x \le \pi$}. **(08 Marks)**

6 a. Let f : R → R be defined by, $f(x)=\begin{cases} 3x-5, & x>0 \\ -3x+1, & x \le 0 \end{cases}$. Find $f^{-1}(0)$, $f^{-1}(1)$, $f^{-1}(3)$ and $f^{-1}([-5, 5])$. **(06 Marks)**

b. Prove that a function f : A → B is invertible if and only if it is one-to-one and onto. **(08 Marks)**

c. Prove that if 151 integers are selected from {1, 2, 3, …., 300}, then the selection must include two integers x, y where x | y or y | x. **(06 Marks)**

7 a. Define the binary operation ∘ on Z by x ∘ y = x + y + 1. Verify that (Z, ∘) is an Abelian group. **(05 Marks)**

b. Let (G, •) and (H, *) be two groups with respective identities e_G, e_H. If f : G → H is a homomorphism, then prove that i) $f(e_G) = e_H$ ii) $f(a^{-1}) = [f(a)]^{-1}$ for all a ∈ G
iii) f(S) is a subgroup of H for each subgroup S of G. **(08 Marks)**

c. Define cyclic group. Prove that every subgroup of a cyclic group is cyclic. **(07 Marks)**

8 a. Define group code. Let $E : Z_2^m \to Z_2^n$, m < n be the encoding function given by a generator matrix G or the associated parity – check matrix H. Prove that C = E(Z_2^m) is a group code. **(10 Marks)**

b. Define a ring and an integral domain. Let R be a commutative ring with unity. Prove that R is an integral domain if and only if for all a, b, c ∈ R, where a ≠ z, (additive identity) ab = ac ⇒ b = c. **(10 Marks)**

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Third Semester B.E. Degree Examination, Dec. 07 / Jan. 08

Data Structures with C

Time: 3 hrs. Max. Marks:100

Note : ***Answer any FIVE full questions.***

1 a. Given the following declarations:
int x ; double d; int *p; double *q;
Which of the following expressions are not allowed?
i) p = &x; ii) p = &d; iii) q = &x; iv) q = &d v) p = x; **(05 Marks)**

b. Show what would be printed from the following block:

```
/* local definitions */
int x [2] [3] = {
                  { 4, 5, 2},
                  { 7, 6, 9}
                };
   /* statements*/
   fun (x);
   fun (x+1);
   return 0;
}
void fun (int (*p)[3])
{
  print f ("1n %d %d %d", (*p)[0], (*p)[1], *p[2]);
  return;
}
```

(06 Marks)

c. Briefly explain memory allocation functions. **(09 Marks)**

2 a. Implement i) Copying one string to another ii) Reversing the given string.
Without using string library functions in 'C'. **(12 Marks)**

b. Write a C program to represent a complex number using structure and add two complex numbers. **(08 Marks)**

3 a. Define stack and operations over stack. Implement reversing a string using stack (array implementation) in C. **(12 Marks)**

b. What is recursion? Explain efficiency of recursion. Write a 'C' recursive program to solve tower of Hanoi problem. **(08 Marks)**

4 a. Write a C program to implement multiple stacks using single array. **(12 Marks)**

b. What is a linear queue? What are the applications of linear queue? Implement insert and delete operations. **(08 Marks)**

5 a. Given an ordered linked list whose first node is denoted by 'start' and node is represented by 'key' as information and 'link' as link field. Write a C program to implement deleting number of nodes (consecutive) whose 'key' values are greater than or equal to 'K_{min}' and less than 'K_{max}'. **(12 Marks)**

b. Write a C program to implement insertion to the immediate left of the K^{th} node in the list. **(08 Marks)**

6 a. Write a C program to implement doubly linked list with following operations:
i) Create ii) Insert. **(10 Marks)**

b. Implement concatenation of two circular singly linked lists List 1 and List 2. Use header nodes to implement the list. **(10 Marks)**

7 a. Implement Binary tree traversals in C: i) Inorder ii) Preorder iii) Postorder. **(10 Marks)**

b. What are the applications of binary tree? Implement binary search tree and check for duplicate data. **(10 Marks)**

8 Write short notes on:
a. Threaded binary tree b. Applications of stacks c. Array implementation of binary trees.
d. Structures and unions **(20 Marks)**

USN | | | | | | | | | | **06CS36**

Third Semester B.E. Degree Examination, Dec. 07 / Jan. 08

UNIX and Shell Programming

Time: 3 hrs. Max. Marks:100

Note : *Answer any FIVE full questions.*

1 a. Explain UNIX architecture and its salient features. Distinguish between INTERNAL and EXTERNAL commands. **(08 Marks)**

b. Explain with example different types of files supported in UNIX. **(05 Marks)**

c. What is the output of the following commands: i) echo $PATH ii) ls –l/wc –l iii) type mkdir; mkdir new; iv) who > userlist **(04 Marks)**

d. Explain man command with its option. **(03 Marks)**

2 a. Explain briefly the file attributed listed using ls –l command. **(05 Marks)**

b. Explain with suitable example how and who can change file permissions. **(05 Marks)**

c. Explain different modes in vi editor and list commands in each mode. **(06 Marks)**

d. How to do the following using vi editor: i) Combine 5 lines in to single line ii) Move the cursor to last line in a file iii) Replace has with have in the current line iv) Add /* at the beginning of the line and */ at the end of the line. **(04 Marks)**

3 a. Explain the mechanism of a process creation and role of system calls. **(05 Marks)**

b. Explain the following commands with suitable example and list its options: i) ps ii) kill. **(05 Marks)**

c. Define job. How is job control done in UNIX? Explain with example. **(05 Marks)**

d. What are environment variables that control UNIX system? Explain any three such variables. **(05 Marks)**

4 a. Explain with example find command and its options. **(06 Marks)**

b. Write a note on sort command. Discuss its options with example. **(04 Marks)**

c. Explain the following commands: i) umask 022, its effect on files and directions ii) find / -name a.out –o –name core –print iii) head results.txt | tail +5 iv) tr '^ $' 'R' <US.txt>India.txt v) date|cut –d " " –f 1 **(05 Marks)**

d. Differentiate between hard-link and soft-link in UNIX with example. **(05 Marks)**

5 a. What is the difference between wildcard and regular expression? Explain with examples Basic Regular Expression and Extended regular expression. **(06 Marks)**

b. Explain the following commands: i) ls –l | grep "^d" > directories ii) grep –v "USA" news.txt | wc –l iii) sed '10,$ s/loop/ loop with in loop/g' <loop.txt> moreloops iv) grep "$SHELL$" /etc/passwd | cut-d ":" –f 1 v) grep a b c > found.txt **(10 Marks)**

c. What is sed? Explain with example line addressing and context addressing in sed. **(04 Marks)**

6 a. What is shell programming? Write a shell script to create a menu which displays the list of files, current users, contents of a particular file and process status of the system based on the user choice. **(07 Marks)**

b. Explain the expr command applicable to numeric and string functions. **(05 Marks)**

c. Explain the following with reference to shell programming:i) $? ii) test iii) shift iv) trap. **(04 Marks)**

d. Write a shell script to display list of all process running in the system every 30 seconds for five times using a i) while loop ii) for loop. **(04 Marks)**

7 a. Write a note on awk. Explain built-in variables. **(06 Marks)**

b. Write an awk sequence to find the DA, HRA and gross pay of employees. DA at 50% of basic, HRA at 25% of basic and the gross pay is sum of basic pay, DA and HRA, also compute the average gross pay. **(08 Marks)**

c. Explain with example the following built in functions: i) split( ) ii) substr( ) iii) length( ) iv) index( ) **(06 Marks)**

8 a. Explain the following in perl i) $_default variable ii) foreach loop construct iii) join( ) **(06 Marks)**

b. Write a PERL program that accepts decimal number as arguments and convert it into binary number. **(07 Marks)**

c. Using command line arguments, write a Perl program to find whether a given year is leap year. **(07 Marks)**