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06MAT31

Third Semester B.E. Degree Examination, Dec.08/Jan.09
Engineering Mathematics III

Time: 3 hrs. Max. Marks:100

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

PART - A

1 a. Find the Fourier series fort he function $f(x) = |x|$ in $-\pi \le x \le \pi$.

Hence deduce that $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+\ldots\ldots=\frac{\pi^2}{8}$ (06 Marks)

b. Expand the function f(x) defined by

$$f(x)=\begin{cases}\frac{1}{4}-x & \text{for } 0<x<\frac{1}{2}\\ x-\frac{3}{4} & \text{for } \frac{1}{2}<x<1\end{cases}$$

In a half – range sine series. (07 Marks)

c. Obtain the complex Fourier series for the function

$$f(x)=\begin{cases}0 & \text{for } 0<x<l\\ a & \text{for } 1<x<2l\end{cases}$$

Over the interval $(0, 2l)$. (07 Marks)

2 a. Find the Fourier transform of $f(x)=\begin{cases}1-x^2, & \text{for } |x|\le 1\\ 0, & \text{for } |x|>1\end{cases}$

Hence evaluate $\int_0^\infty \left(\frac{x\cos x-\sin x}{x^3}\right)\cos\frac{x}{2}dx$. (06 Marks)

b. Solve the integral equation :

$$\int_0^\infty f(\theta)\cos\alpha\theta d\theta=\begin{cases}1-\alpha, & 0\le\alpha\le 1\\ 0, & \alpha>1\end{cases}$$

Hence evaluate $\int_0^\infty \frac{\sin^2 t}{t^2}dt$. (07 Marks)

c. Show that the inverse finite Fourier sine transform of

$$F_s(n)=\frac{1}{n}\left\{1+\cos n\pi-2\cos\frac{n\pi}{2}\right\}$$

is $f(x)=\begin{cases}1, & 0\le x\le \pi/2\\ -1, & \pi/2<x\le\pi\end{cases}$ (07 Marks)

3 a. Form a partial differential equation by eliminating the arbitrary functions f and g from the relation

$Z = f(y + 2x) + g(y - 3x)$ (06 Marks)

b. Solve the equation $\frac{\partial^2 z}{\partial x^2}=x+y$, given that $z = y^2$ when $x = 0$, and $\frac{\partial z}{\partial x}=0$, when $x = 2$. (07 Marks)

c. Solve : $(y + z)p + (z + x)q = x + y$. (07 Marks)

4 a. Derive the one-dimensional heat equation. **(06 Marks)**

b. Obtain D′ Alembert's solution of the one dimensional wave equation:

$\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$. **(07 Marks)**

c. Solve the wave equation $c^2 \frac{\partial^2 u}{\partial x^2} = \frac{\partial^2 u}{\partial t^2}, 0 < x < l$ under the following conditions :

i) $u(0,t) = u(l,t) = 0$; ii) $u(x,0) = u_o \text{ Sin } \frac{\pi x}{l}$; iii) $\frac{\partial u}{\partial t}(x,0) = 0$ **(07 Marks)**

5 **PART - B**

a. Using the Regula – Falsi method, find the root of the equation $xe^x = \cos x$ that lies between 0.4 and 0.6. Carry out four iterations. **(06 Marks)**

b. Solve the following system of equations by using the Gauss – Jordan method :

$x + y + z = 9$

$2x + y - z = 0$

$2x + 5y + 7z = 52$. **(07 Marks)**

c. Using the power method, find the largest eigenvalue and the corresponding eigenvector of the matrix

$$A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & 1 \\ 2 & -1 & 3 \end{bmatrix}$$

Taking $[1, 1, 1]'$ as the initial eigenvector. Perform five iterations. **(07 Marks)**

6 a. Find the interpolating polynomial for the function $y = f(x)$ given by $f(0) = 1$, $f(1) = 2$, $f(2) = 1$ $f(3) = 10$. Hence evaluate $f(0.75)$. **(06 Marks)**

b. Apply Lagrange's formula to find a root of the equation $f(x) = 0$, given that $f(30) = -30$, $f(34) = -13$, $f(38) = 3$, $f(42) = 18$. **(07 marka)**

c. Evaluate $\int_0^{\pi/2} \sqrt{\cos\theta}\, d\theta$ by using the Simpson's $\frac{1}{3}$ rule, taking 9 ordinates. **(07 Marks)**

7 a. Derive Euler's equation in the form

$\frac{df}{\partial y} - \frac{d}{dx}\left(\frac{\partial f}{\partial y'}\right) = 0$ **(06 Marks)**

b. Find the external of the functional

$I = \int_0^{\pi/2} (y^2 - y'^2 - 2y \text{ Sin} x)dx$

Under the end conditions $y(0) = y\left(\pi/2\right) = 0$. **(07 Marks)**

c. Prove that catenary is the curve which when rotated about a line generates a surface of revolution of minimum area. **(07 Marks)**

8 a. Find the Z –transforms of

i) Coshn θ; ii) Sin (3n +5). **(06 Marks)**

b. Obtain the inverse Z – transform of

$\frac{3z^2 + z}{(5z-1)(5z+2)}$. **(07 Marks)**

c. By employing Z – transform, Solve the difference equation : $y_{n+2} + 6y_{n+1} + 9y_n = 2^n$, with $y_0 = y_1 = 0$. **(07 Marks)**

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MATDIP 301

Third Semester B.E. Degree Examination, Dec 08 / Jan 09
Advanced Mathematics - I

Time: 3 hrs. Max. Marks:100

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

1 a. Define modulus and amplitude of a complex number x+iy and express $\frac{a+ib}{c+id}$ in x+iy form. **(06 Marks)**

b. Reduce $1 - \cos\alpha + i\sin\alpha$ to the modulus amplitude form. **(07 Marks)**

c. If $\alpha + i\beta = \frac{1}{a+ib}$ then prove that $(\alpha^2+\beta^2)(a^2+b^2) = 1$ **(07 Marks)**

2 a. Find the n^{th} derivative of $\frac{x}{(x-1)(2x+3)}$. **(06 Marks)**

b. Find the nth derivative of $e^{ax}.\cos(bx + c)$. **(07 Marks)**

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

3 a. If $u = x\log xy$ where $x^3+y^3+3xy=1$, find $\frac{du}{dx}$ as a total derivative. **(06 Marks)**

b. If u is a homogeneous function of degree 'n' in x and y, then prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = nu$. **(07 Marks)**

c. If $x = r\cos\theta$, $y = r\sin\theta$, then prove that $J.J' = 1$. **(07 Marks)**

4 a. Find the angle of intersection of curves $r = \sin\theta + \cos\theta$ and $r = 2\sin\theta$. **(06 Marks)**

b. Find the pedal equation of the curve $r^m = a^m.\sin m\theta$. **(07 Marks)**

c. Using Maclaurin's series, expand $e^{\sin x}$ upto the terms containing x^4. **(07 Marks)**

5 a. Obtain the reduction formula for $I_n = \int_0^{\pi/2} \cos^n\theta d\theta$, n being a positive integer and hence evaluate I_6. **(06 Marks)**

b. Evaluate $\int_0^5 \int_0^{x^2} x(x^2+y^2)dxdy$. **(07 Marks)**

c. Evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} xyzdxdydz$. **(07 Marks)**

6 a. Define Beta, Gamma functions and prove that $\overline{|(n+1)} = n\overline{|n}$. **(06 Marks)**

b. Prove that $\beta(m, n) = \dfrac{\lceil(m).\lceil n}{\lceil(m+n)}$ **(07 Marks)**

c. Express the intergral $\int_0^1 \dfrac{dx}{\sqrt{1-x^2}}$ in terms of Gamma functions. Prove that $\sqrt{(n+1)} = n!$, provided n is a positive integer. **(07 Marks)**

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

b. Solve $(x^2-y^2)\,dx - xydy = 0$. **(07 Marks)**

c. Solve $\dfrac{dy}{dx} + \dfrac{y\cos x + \sin y + y}{\sin x + x\cos y + x} = 0$ **(07 Marks)**

8 a. Solve $\dfrac{d^2y}{dx^2} + \dfrac{dy}{dx} + y = \sin 2x$. **(06 Marks)**

b. Solve $(D^2+2D+1)y = x^2$. **(07 Marks)**

c. Solve $\dfrac{d^2y}{dx^2} + 5\dfrac{dy}{dx} + 6y = e^{2x}$. **(07 Marks)**

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06CS32

Third Semester B.E. Degree Examination, Dec 08 / Jan 09
Electronic Circuits

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Define the condition for a stiff clipper and a stiff clamper. **(02 Marks)**

b. The circuit in fig.Q1.(b) a silicon diode IN314. From its data sheet the forward current is 10mA at 1V. Input signal is a sinusoidal wave of 10V peak to peak. What is the circuit? Find $R_{S(minimum)}$ and $R_{L(minimum)}$. What is $V_{out(max)}$ and $V_{out(min)}$. Sketch the output waveform. If the diode is reversed, what is $V_{out(max)}$ and $V_{out(min)}$. **(08 Marks)**

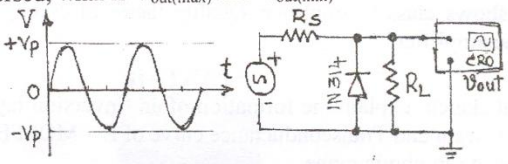


Fig.Q1(b)

c. What is an opto – electronic device? With the help of a simple circuit, explain the relationship between LED voltage, current and brightness. What is the condition for constant brightness of LED? What is the typical voltage drop across a LED? **(06 Marks)**

d. Describe how an LED is used as a Polarity Tester. **(04 Marks)**

2 a. Describe ac – short and ac – ground. **(04 Marks)**

b. What is the lowest frequency at which a good by passing exists in the circuit in fig.Q2(b)? (Hint Thevenin's Resistance). Given $R_1 = 2k\Omega$, $R_2 = 8\ k\Omega$ and $C = 100\mu F$. **(04 Marks)**

c. Fig. Q2(c) is a CE amplifier. Draw dc and π - model ac equivalent circuits. Calculate quiescent voltages and currents required, impedances of the input base and stage, voltage gain and output voltage. **(12 Marks)**

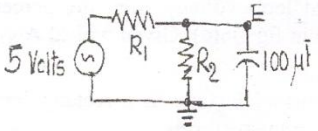


Fig.Q2(b)

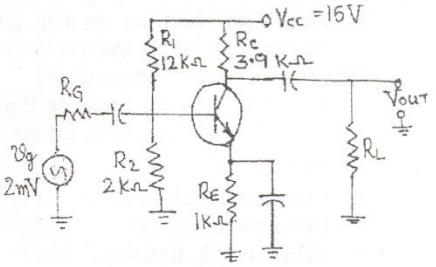


Fig.Q2(c)

3 a. With the help of a neat circuit diagram, explain two stage feed back and derive equation for voltage gain. **(09 Marks)**

b. Compare the characteristics of CE and CC amplifiers. **(05 Marks)**

c. In fig.Q3(c), find overall gain, base – current of Q1 and input impedance of base Q1, given $\beta 1 = \beta = 100$ as gain. **(06 Marks)**

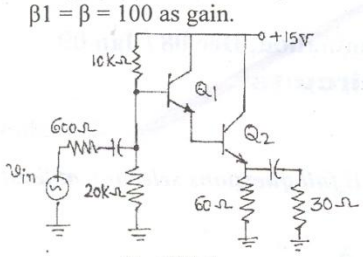


Fig.Q3(c)

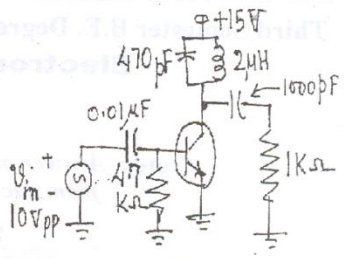


Fig.Q4(c)

4 a. Draw 'dc' Load Line and 'ac' Load Line for a VDB amplifier and derive equations for load lines. **(08 Marks)**

b. In a class 'C' amplifier define duty cycle, conduction angle and derive equation for 'ac' collector resistance. **(06 Marks)**

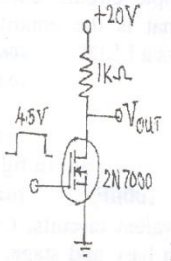
c. Fig.Q4(c) shows class C amplifier. Quality factor of coil $Q_L = 100$. What is the band – width of the amplifier? **(06 Marks)**

PART - B

5 a. With a neat sketch, explain the formation of an 'inversion layer' in a E - MOSFET. Draw and explain Drain and Transconductance curve of E – MOSFET. **(10 Marks)**

b. Explain biasing in ohmic range. **(05 Marks)**

c. In the circuit fig.Q5(c), what is the output voltage. **(05 Marks)**



From data sheet,
$V_{GS}(ON) = 4.5$ V
$I_D(ON) = 75$mA
$R_D(ON) = 6\Omega$

Fig. Q5(c)

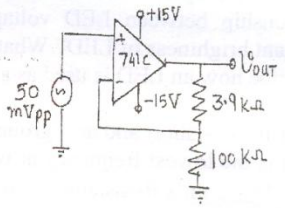


Fig.Q6(c)

6 a. Define Decibel voltage gain, Decade, Octave and PdBM. **(04 Marks)**

b. From data sheet, an op amp gives a mid – band voltage gain of 200,000, a cut – off frequency of 10 Hz and a roll off rate of 20 dB per decade. Draw the ideal Bode Plot. What is the Ordinary Voltage Gain? **(08 Marks)**

c. Calculate the feed back fraction, ideal closed loop voltage gain, the percent error and closed loop voltage gain, for the VCVS circuit in fig.Q6(c). Given typical A_{VOL} of 100,000 for the 741 C. **(08 Marks)**

7 a. Construct an Op-amp circuit to convert a sinusoidal wave to a rectangular wave form. Explain with relevant formulas, neat diagrams and waveforms. **(10 Marks)**

b. Using a 555 functional block, construct a monostable multi vibrator and explain its function. **(10 Marks)**

8 a. Draw simple sketches of IC Linear Regulators and IC switching regulators and compare their characteristics. **(10 Marks)**

b. Draw the circuit diagram of Zener and two transistor discrete series regulator and derive equation for the output voltage. **(06 Marks)**

c. Define Headroom and Power dissipation. **(04 Marks)**

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06CS33

Third Semester B.E. Degree Examination, Dec.08/Jan.09
Logic Design

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. What are universal gates? Realize basic gates using only NAND gates. **(05 Marks)**

b. Simplify the following logic equation using Karnaugh map and give the implementation of the simplified expression. $F(A,B,C,D) = \Sigma\, m(7) + d(10,11,12,13,14,15)$ **(05 Marks)**

c. Give simplified logic equation using Quine-McClusky method for the following Boolean function. $F(A,B,C,D) = \Sigma\, m\,(0,1,2,3,10,11,12,13,14,15)$ **(10 Marks)**

2 a. Design a 32-to-1 multiplexer using two 16-to-1 multiplexer and one 2-to-1 multiplexer. **(05 Marks)**

b. Show how two 1-to-16 demultiplexers can be connected to get a 1-to-32 demultiplexer. **(05 Marks)**

c. Give 7-segment decoder using PLA. **(05 Marks)**

d. Give verilog HDL code for 4-to-1 multiplexer using conditional 'assign' and 'case' statements. **(05 Marks)**

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

b. Design full – subtractor. **(06 Marks)**

c. What is ALU? Show how A>B and A ≥ B can be generated in IC 74181 ALU. **(05 Marks)**

d. What is fast adder? Give logic circuit for 2-bit fast adder. **(05 Marks)**

4 a. Explain monostable multi-vibrator with circuit diagram and waveform. **(08 Marks)**

b. Realize the sequencial circuit for the state diagram shown in Fig.4(b). **(06 Marks)**

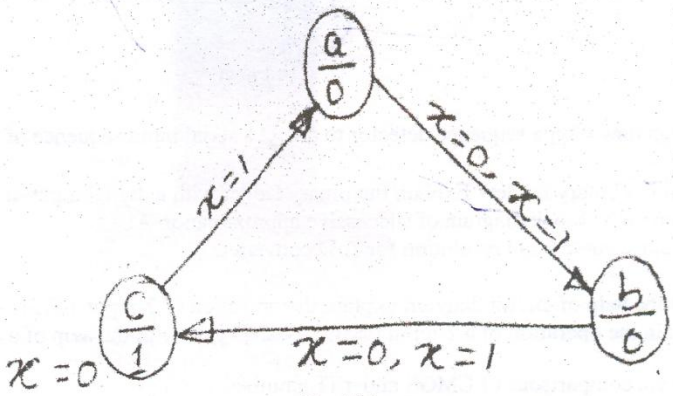

Fig.4(b)

c. Show how a SR-flip flop can be converted into a T-flip flop. **(06 Marks)**

PART – B

5 a. Explain 4-bit shift register of serial with timing diagram. **(05 Marks)**

b. Explain Ripple counter (Asynchronous counter) with truth table and waveform. **(05 Marks)**

c. Design a self-correcting modulo-6 counter as described in state sequence of Fig.5(c) in which all the unused state leads to state CBA= 000. **(10 Marks)**

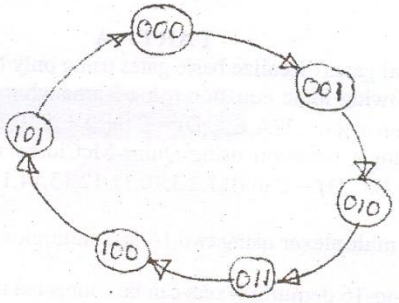

Fig.5(c)

6 a. A sequential circuit has one input and one output. The state diagram is shown in Fig.6(a). Design the sequential circuit with (i) D-flip flop (ii) T-flip flop. **(10 Marks)**

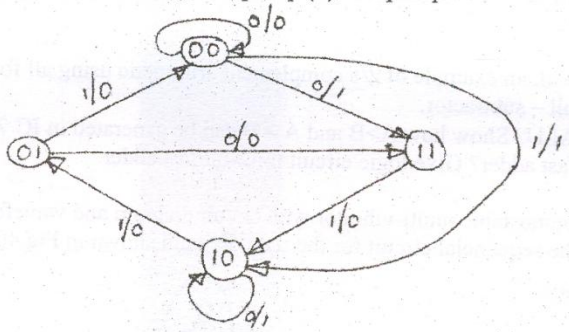

Fig.6(a)

b. Design mealy type sequence detector to detect a serial input sequence of 101. **(10 Marks)**

7 a. What is a binary ladder? Explain the binary ladder with a digital input of 1000. **(10 Marks)**

b. Explain with block diagram of successive approximation ADC. **(06 Marks)**

c. Explain accuracy and resolution for A/D converter. **(04 Marks)**

8 a. With the help of circuit diagram explain the operation of 2-input TTL-NAND gate. **(08 Marks)**

b. Explain the operation of a 2-input CMOS-NAND gate with the help of a circuit diagram. **(06 Marks)**

c. Give six comparisons of CMOS and TTL families. **(06 Marks)**

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06CS34

Third Semester B.E. Degree Examination, Dec.08/Jan.09
Discrete Mathematical Structure

Time: 3 hrs. Max. Marks:100

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

Part A

1 a. Define Tautology:
Show that $[(p \vee q) \wedge \neg(\neg p \wedge (\neg q \vee \neg r))] \vee (\neg p \wedge \neg q) \vee (\neg p \wedge \neg r)$ is tautology using laws. **(08 Marks)**

b. Define dual of logical statement. Write dual of logical statement,
$(P \vee T_0) \wedge (q \vee F_0) \vee (r \wedge s \wedge T_0)$. **(04 Marks)**

c. Write truth values for NAND and NOR. **(02 Marks)**

d. Test validity of the following statement:

i) If there is strike by student, the examination will be postponed,
The Exam was not postponed
$\therefore$ There were no strike by student

ii) If Ravi studies, then he will pass DMS. If Ravi does not play cricket, then he will study
Ravi failed in DMS
$\therefore$ Ravi played cricket. **(06 Marks)**

2 a. Define converse, inverse, contrapositive of implication, hence find converse, inverse, contrapositive for $\forall x, (x > 3) \rightarrow (x^2 > 9)$ where universal set is R. **(04 Marks)**

b. For any two odd integer mandn show that,
i) m + n is even. ii) mn is odd. **(06 Marks)**

c. Using quantifier method find whether following argument is valid,
If a triangle has two equal sides, then it is isoceles. If a triangle is isoceles, then it has two equal angles.
The triangle ABC does not have two equal angles
$\therefore$ ABC does not have two equal sides **(10 Marks)**

3 a. Find A and B if $A \cup B = \{1, 2, 4, 5, 7, 8, 9, 10\}$, $A \cap B = \{2, 4, 7\}$, $A - B = \{1, 8\}$. **(02 Marks)**

b. Using laws show that, $(A \cap B) \cup (A \cap B \cap \bar{C} \cap D) \cup (\bar{A} \cap B) = B$. **(06 Marks)**

c. 21 students took Maths exam having 3 questions and all of them answered at least one question of 5 fail to answer I[st] question, 6 fail to answer 2[nd] question 7 fail to answer 3[rd] question. If 9 answered all 3 question, find how many answered exactly one question. **(08 Marks)**

d. Find probability of two persons A and B contradicting when they narrate same story, given A speaks 60% true and B speaks 20% false. **(04 Marks)**

4 a. A sequence $\{a_n\}$ defined by $a_1 = 4$, $a_n = n + a_{n-1}$ for $n \geq 2$
Show that explicit expression of $a_n = 3 + \frac{1}{2}(n^2 + n)$. **(07 Marks)**

b. Prove by mathematical induction, $O[P(A)] = 2^n$. If O(A)=n where A is given set. **(07 Marks)**

c. Let R = {(1, 2), (1, 3), (2, 4), (3, 2)} be relation on A = {1, 2, 3, 4} find M(R) and $[M(R)]^2$ hence find R^2. **(06 Marks)**

Part B

5 a. Define equivalence relation and equivalence class with one example. **(07 Marks)**

b. For A = {a, b, c, d, x, y,z), define equivalence relation hence find equivalence class. Also find portion of A. **(07 Marks)**

c. Find $A \times B$, $A \times (B \cup C)$, $(A \cap B) \times C$ of A = {1, 2, 3, 4), B = {3, 4, 5, 6), C = {2, 4, 6). **(06 Marks)**

6 a. Define a function. Prove that function $f : A \to B$ is inversible. Iff it is one-one and onto. **(07 Marks)**

b. Define sterling number of 2nd kind. If $|A| = 7$, $|B| = 4$ find number of onto function from A to B. Hence find S(7, 4). **(07 Marks)**

c. If f(x) = x–1, g(x) = 3x $h(x) = \begin{cases} 0 & x \text{ even} \\ 1 & x \text{ odd} \end{cases}$. Show that $f \circ (g \circ n) = (f \circ g) \circ n$. **(06 Marks)**

7 a. Let G be set non-zero real. $a * b = \frac{ab}{2}$ for a, b ∈ G. Show that (G, *) is Abelian group. **(06 Marks)**

b. Define sub group. If H, K are subgroup of G. Prove that $H \cap K$ is also subgroup. Is $H \cup K$ is subgroup of G. Justify the answer. **(06 Marks)**

c. Define left and right cosets. State and prove Lagrange's theorem. **(08 Marks)**

8 a. The Generator matrix for an encoding function, $E : Z_2^3 \to Z_2^6$ is given by,

$$G = \begin{bmatrix} 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 1 & 0 & 1 \end{bmatrix}$$

. Find the code word assigned to 110 to 010. Also find associated parity check. **(08 Marks)**

b. Define: i) Hamming metric ii) The sphere of radius k centered at X. Give example in each case. **(06 Marks)**

c. Define ring with an example. **(06 Marks)**

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06CS35

Third Semester B.E. Degree Examination, Dec 08 / Jan 09
Data Structures with C

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Write the output for the following program **(04 Marks)**

```
# include < stdio.h >
void main ( )
{
    int a = 7, b = 8 ; * p, * q ;
    p = & a
    q = & b
    print f (" 1n % d", ++a) ;
    print f (" 1n % d", ++(*p)) ;
    print f (" 1n % d", --(*q)) ;
    print f (" 1n % d", --b) ;
}
```

b. What would be printed form the following block, explain. **(08 Marks)**

```
Void main ( )
{
  int num [5] = {3, 4, 6, 2, 1};
  int * p = num;
  int * q = num + 2 ;
  int * r = snum [1] ;
  print f ("1n% d % d", num [2], * (num + 2));
  print f ("1n% d % d", * p, *(p + 1));
  print f ("1n% d % d", * q, * (q + 1));
  print f ("1n% d % d", * r , * (r + 1));
}
```

c. What do you understand by Dynamic Memory Allocation? Explain any three function that support dynamic memory allocation. **(08 Marks)**

2 a. Write a function newstrcpy and newstrcat that does the same job as strcat and strcpy without using library function. **(06 Marks)**

b. Explain the following function with suitable examples. i) fseek ( ) ii) rewind ( ) iii) ftell ( ). **(06 Marks)**

c. List the differences between union and structures. Write a structure student with id, name and marks 1, marks 2, marks 3. Write functions
read _ data ( ) to read 5 students data and
print_data ( ) to display the student details. **(08 Marks)**

3 a. Transfer each of the following infix expression to its postfix form
i) (A + B) * (C & (D – E) + F) – G ii) (A + B) * (C - D) & E * F. **(06 Marks)**
iii) A + (((B – C) * (D – E) + F) / G) & (H – J).

b. Show the detailed contents of stack for a given postfix expression 623 + - 382/ + * 2 & 3 + and evaluate the expression. **(08 Marks)**

c. Write a 'C' function to check whether a string is palindrome to not using stack. **(06 Marks)**

4 a. What is Recursion? Write a recursive function for Binary search. **(06 Marks)**

b. What is Priority Queue? Explain about different types of priority queues. **(05 Marks)**

c. Write a C program to simulate the working of circular queue of integers using array. Provide the following operations. i) Insert ii) Delete iii) Display. **(09 Marks)**

PART – B

5 a. Explain how the linked list can be represented using arrays. **(04 Marks)**

b. Write a C function to merge two ordered linked list. **(06 Marks)**

c. Write a C program to perform the operation on stack using singly linked list. **(10 Marks)**

6 a. Explain the following : i) Circular list ii) Doubly linked list. Using suitable diagrams. **(06 Marks)**

b. Write a C routine to perform following operations using circular linked list.
i) To place the elements of a list in increasing order.
ii) To find the sum of integers and the number of elements in a list. **(10 Marks)**

c. What are the advantages and disadvantages of representing group of item as an array versus a linear linked list? **(04 Marks)**

7 a. Write a expression tree for the following postfix expression. ab + cd - * ef + /. **(06 Marks)**

b. Write inorder, preorder and postorder traversals for the following tree (ref. Fig.7(b)) **(06 Marks)**

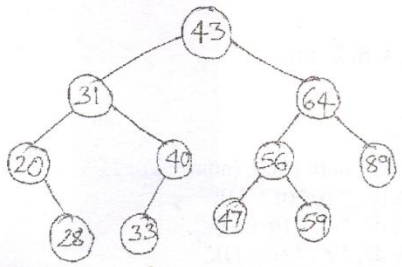

Fig.7(b)

c. Explain array representation of binary tree and write a function to search a given element in a Binary search tree using array representation. **(08 Marks)**

8 a. Write a function to : i) Find the maximum element in the Binary search tree. ii) To search an element in the tree. **(08 Marks)**

b. Explain the following : i) Binary search tree ii) Threaded binary tree iii) Strictly binary tree iv) Almost complete binary tree. **(08 Marks)**

c. Write a C routine to count the numbers of nodes in a Binary search tree. **(04 Marks)**

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06CS36

Third Semester B.E. Degree Examination, Dec.08/Jan.09
UNIX & Shell Programming

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Explain the salient features of UNIX operating system. **(07 Marks)**

b. Explain the concept of absolute pathname and relative pathname with suitable examples. **(04 Marks)**

c. What is parent –child relationship? With the help of neat diagram explain, UNIX file system tree. **(05 Marks)**

d. What is the output of the following command. **(04 Marks)**

(i) echo $PATH
(ii) man man
(iii) cmp f_1 f_2 [f_1 and f_2 are identical]
(iv) ls -i

2 a. What is file permission? What are the different ways of setting file permission? Explain **(08 Marks)**

b. Explain the following with respect to vi editor. **(06 Marks)**

(i) Search for a pattern printf, then repeat the search in both forward and backward direction
(ii) : $s | director | member | g
(iii) : .w tempfile
(iv) : . , $w tempfile
(v) recover
(vi) 20h

c. Explain the different modes of operation in a vi editor with a suitable diagram. **(06 Marks)**

3 a. Explain the concept of Escaping and quoting with suitable examples. **(06 Marks)**

b. Frame wild card pattern for the following: **(06 Marks)**

(i) Retrieve hidden files
(ii) Any number of characters followed by 4 characters.
(iii) Matches all filenames that do not begin with an alphabetic character.

c. What is a process? Explain how a process is created using the three primitives fork, exec and wait. **(08 Marks)**

4 a. Discuss standard input, standard output and standard errors files, in UNIX. **(06 Marks)**

b. Explain the following environment variables with examples. **(06 Marks)**

(i) SHELL
(ii) PS2
(iii) HOME

c. Explain the following commands with examples. **(08 Marks)**

(i) tr
(ii) tee
(iii) sort
(iv) pr

PART – B

5 a. Explain grep command with any five options with suitable examples. **(06 Marks)**

b. List and explain Extended Regular Expression (ERE) set used by grep, egrep and awk. **(06 Marks)**

c. Explain the following:
   (i) sed '3q' abc
   (ii) ls –l | grep '^d' > directories
   (iii) sed –n '$p' abc
   (iv) sed –n '3 , $!p' abc **(08 Marks)**

6 a. Explain special parameters used by the shell. **(06 Marks)**

b. Explain the expr command applicable to numeric and string functions. **(06 Marks)**

c. Explain here document with an example. Also mention its use. **(04 Marks)**

d. Explain trap in shell scripts with a suitable example. **(04 Marks)**

7 a. Explain awk built-in variables and built-in function with suitable examples. **(10 Marks)**

b. Explain if statement, for and while loop statement with respect to awk with suitable example. **(10 Marks)**

8 a. Explain the following in perl.
   (i) split
   (ii) join
   (iii) $ - default variable **(06 Marks)**

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

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

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