Examination:	November-December 2018	**Date:**	20-11-2018
Branch:	Computer Engineering	**Subject:**	AM-III
Class/SEM:	SE/III	**Paper Code:**	24408

Examination:	November-December 2018	**Date:**	20-11-2018
Branch:	Computer Engineering	**Subject:**	AM-III
Class/SEM:	SE/III	**Paper Code:**	57369

Examination:	November-December 2018	**Date:**	28-11-2018
Branch:	Computer Engineering	**Subject:**	ECCF
Class/SEM:	SE/III	**Paper Code:**	35354

Examination:	November-December 2018	**Date:**	28-11-2018
Branch:	Computer Engineering	**Subject:**	DLDA
Class/SEM:	SE/III	**Paper Code:**	57379

Examination:	November-December 2018	**Date:**	4/12/2018
Branch:	Computer Engineering	**Subject:**	DS
Class/SEM:	SE/III	**Paper Code:**	40416

Examination:	November-December 2018	**Date:**	4/12/2018
Branch:	Computer Engineering	**Subject:**	DS
Class/SEM:	SE/III	**Paper Code:**	54931

Examination:	November-December 2018	**Date:**	11/12/2018
Branch:	Computer Engineering	**Subject:**	DLDA
Class/SEM:	SE/III	**Paper Code:**	58625

Examination:	November-December 2018	**Date:**	11/12/2018
Branch:	Computer Engineering	**Subject:**	ECCF
Class/SEM:	SE/III	**Paper Code:**	26300

Examination:	November-December 2018	**Date:**	17-12-18
Branch:	Computer Engineering	**Subject:**	DS
Class/SEM:	SE/III	**Paper Code:**	36286

Comp | sem II | CBCGS | AM - II | 20/11/2018.

Paper / Subject Code: 50901 / Applied Mat

Q. P. Code : 24408

Time : 3 hrs **Marks : 80**

NB 1. Question No.I is compulsory
2. Attempt any three from the remaining six questions
3. Figures to the right indicate full marks

Q1a If Laplace transform of $erf(\sqrt{t}) = \frac{1}{s\sqrt{s+1}}$, then find $L\{e^t.erf(2\sqrt{t})\}$ [20]

b Find the Orthogonal Trajectory of the family of curves given by $e^{-x}.\cos y + x.y = c$

c Find Complex Form of Fourier Series for . e^{2x} ; $0 < x < 2$

d. If the two regression equations are $5x - 6y + 90 = 0$, $15x - 8y - 180 = 0$,

find the means of x and y, the Correlation Coefficient and Standard deviation of x if variance of Y is 1

Q2 Show that the function is Harmonic and find the Harmonic Conjugate $v = e^x.\cos y + x^3 - 3xy^2$ [6]

b Find Laplace Transform of $f(t) = \begin{cases} t & ;0<t<1 \\ 0 & ;1<t<2 \end{cases}$, $f(t+2) = f(t)$ [6]

c. Find Fourier Series expansion of $f(x) = x - x^2, -1 < x < 1$ [8]

Q3 a Find the Analytic function $f(z) = u + iv$ if $v = \log(x^2 + y^2) + x - 2y$ [6]

b Find Inverse Z transform of $\frac{3z^2 - 18z + 26}{(z-2)(z-3)(z-4)}$, $3 < |z| < 4$ [6]

c Solve the Differential Equation $\frac{d^2y}{dt^2} + 4y = f(t), f(t) = H(t-2), y(0) = 0, y'(0) = 1$ using Laplace Transform [8]

Q4 a Find $Z\{f(k) * g(k)\}$ if $f(k) = \left(\frac{1}{2}\right)^k, g(k) = \cos \pi k$ [6]

b Find the Spearman's Rank correlation coefficient between X and Y. [6]

X	60	30	37	30	42	37	55	45
Y	50	25	33	27	40	33	50	42

Find the inverse Laplace transform of i) $\frac{3s+1}{(s+1)^4}$ ii) $\frac{e^{4-3s}}{(s+4)^{5/2}}$ [8]

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Q. P. Code : 24408

Q5 a Find Inverse Laplace Transform usng Convolution theorem $\frac{1}{(s-4)^2(s+3)}$ [6]

b Show that the functions $f_1(x)=1$, $f_2(x)=x$ are Orthogonal on (-1,1). Determine the constants a, b such that the function $f(x)=-1+ax+bx^2$ is Orthogonal to both $f_1(x), f_2(x)$ on the (-1,1) [6]

c Find the Laplace transform of i) $e^{-3t}\int_0^t t\sin 4t\,dt$ ii) $\int_0^\infty \frac{e^{-t}-e^{-2t}}{t}dt$ [8]

Q6 a Fit a second degree parabola to the given data [6]

X	1	1.5	2	2.5	3	3.5	4
Y	1.1	1.3	1.6	2	2.7	3.4	4.1

bFind the image of $\left|z-\frac{5}{2}\right|=\frac{1}{2}$ under the transformation $w=\frac{3-z}{z-2}$ [6]

c Find Half Range Cosine Series for $f(x)=x\sin x$ in $(0,\pi)$ and hence find $\frac{1}{1.3}-\frac{1}{3.5}+\frac{1}{5.7}-\ldots\ldots=\frac{\pi-2}{4}$ [8]

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Comp | sem III | CBSGS | AM - III | 20/11/2018

Paper / Subject Code: 49301 / APPLIED MATHEMATICS-III

Time: 3 Hours **Marks: 80**

N.B.: 1) Question no.1 is compulsory.
2) Attempt any three questions from Q.2to Q.6.
3) Figures to the right indicate full marks.

Q1. a) Find the Laplace transform of $e^{-t}t\cosh 2t$. [5]

b) Find the half-range cosine series for $f(x)=\begin{cases}1 & ,o<x<\frac{a}{2}\\ -1 & ,\frac{a}{2}<x<a\end{cases}$ [5]

c) Find $\nabla\left(\bar{a}.\nabla\frac{1}{r}\right)$ where $\bar{a}$ is a constant vector. [5]

d) Show that the function $f(z)=z^3$ is analytic and find $f'(z)$ in terms of z. [5]

Q2. a) Find the inverse Z-transform of $F(z)=\frac{3z^2-18z+26}{(z-2)(z-3)(z-4)}$, $3<z<4$. [6]

b) Find the analytic function whose imaginary part is $\tan^{-1}\left(\frac{y}{x}\right)$. [6]

c) Obtain Fourier series for the function $f(x)=\begin{cases}\frac{\pi}{2}+x & ,-\pi<x<0\\ \frac{\pi}{2}-x & ,0<x<\pi\end{cases}$ [8]

Hence ,deduce that $\frac{\pi^2}{8}=\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+\cdots$ and $\frac{\pi^4}{96}=\frac{1}{1^4}+\frac{1}{3^4}+\frac{1}{5^4}+\cdots$

Q3. a) Find $L^{-1}\left[\frac{s^2}{(s^2+1)(s^2+4)}\right]$ using convolution theorem. [6]

b) Show that the set of functions $\phi_n(x)=\sin\left(\frac{n\pi x}{l}\right), n=1,2,3\ldots$ is orthogonal in $[0,l]$. [6]

c) Using Green's theorem evaluate $\oint_C (e^{x^2}-xy)dx-(y^2-ax)dy$ where C is the circle $x^2+y^2=a^2$. [8]

Q4. a) Find Laplace transform of $f(t)=\begin{cases}\frac{t}{a} & ,o<t\le a\\ \frac{(2a-t)}{a} & ,a<t<2a\end{cases}$ and [6]

$f(t)=f(t+2a)$.

b) Prove that a vector field $\bar{f}$ is irrotational and hence find its scalar potential [6]
$\bar{f}=(y\sin z-\sin x)\,i+(x\sin z+2yz)j+(xy\cos z+y^2)k$.

c) Obtain the Fourier expansion of $f(x)=\left(\frac{\pi-x}{2}\right)^2$ in the interval [8]
$0\le x\le 2\pi$ and $f(x+2\pi)=f(x)$ .Also deduce that
$\frac{\pi^2}{6}=\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+\cdots$

Q5.a) Use Gauss's Divergence Theorem to evaluate $\iint_S \bar{N}.\bar{F}ds$ where $\bar{F}=4xi+3yj-2zk$ and S is the surface bounded by x=0, y=0, z=0 and 2x+2y+z=4. [6]

b) Find the Z-transform of $f(k)=ke^{-ak}$, k≥ 0. [6]

c) i) Find $L^{-1}\left[\frac{s+2}{s^2(s+3)}\right]$. [8]

ii) Find $L^{-1}\left[\log\left(\frac{s+a}{s+b}\right)\right]$. [6]

Q6.a) Solve using Laplace transform
$(D^2+3D+2)y=2(t^2+t+1)$, with $y(0)=2$ and $y'(0)=0$. [6]

b) Find the bilinear transformation which maps the points Z=1, i, -1 onto the points W=i, 0, -i . [8]

c) Find Fourier sine integral of $f(x)=\begin{cases}x & ,0<x<1\\ 2-x & ,1<x<2\\ 0 & ,x>2\end{cases}$

Mech I & II / CBSGS / Sem III / Thermo / 28/11/2018.

Paper / Subject Code: 50002 / THERMODYNAMICS

Q. P. Code: 26051

(3 Hours) [Total Marks 80]

N. B. : (1) Question No 1 is **compulsory.**
(2) Solve any **three** questions from remaining **five** questions.
(3) Assume suitable data if required.
(4) Use of Mollier Chart, Steam table is permitted.

1. Explain any **four** of the following: - **20**
   (a) Explain Zeroth law of thermodynamics with its significance.
   (b) Explain principle of increase of entropy.
   (c) What do you mean by available energy and unavailable energy? Explain with suitable example
   (d) Explain Rankine cycle with reheat.
   (e) Explain Atkinson cycle with T-S and H-S diagrams.
   (f) Explain adiabatic flame temperature with its practical significance.

2. (a) What do you mean by steady flow process. Write equation for steady flow process for compressor and boiler. **8**
   (b) A reversible heat engine operates between 875 K and 310 K and drives a reversible refrigerator operating between 310 K and 255 K. The engine receives 2000 kJ of heat and the net work output from the arrangement equals 350 kJ. Make calculations for the cooling effect. **12**

3. (a) Explain:- **8**
   i. State
   ii. Property
   iii. Pure substance
   iv. system
   (b) A lump of steel of mass 8 kg at 1000 K is dropped in 80 kg of oil at 300K Make calculations for the entropy change of steel, the oil and the universe. Take specific heats of steel and oil as 0.5 kJ/kg K and 3.5 kJ/kg K, respectively. **8**
   (c) Show that entropy is a property of system **4**

4. (a) Water at 25^0C is to be heated to 80^0C by utilizing the heat available from a source at a steady temperature of 500^0C. If the ambient temperature is 20^0C, what would be the (i) gain in availability of the water? (ii) Effectiveness of the heating process? **8**
   (b) A steam power plant operates ideally in the basic Rankine cycle. It receives 4 Mpa steam from the boiler firing coal to liberate heat at a steady rate of 100 MW. The steam after expansion in the turbine is exhausted to a condenser that operates at 7.5 kPa. **8**
   Calculate the:-
   i. cycle efficiency
   ii. work ratio for the cycle
   iii. power output (MW) of the plant
   iv. mass flow rate of the working fluid
   v. specific steam consumption

[TURN OVER]

(c) Draw T-S and H-S diagram for steam 4

5. (a) In an air standard Otto cycle has a compression ratio of 8, temperature and pressure at the beginning of compression are 20^0C and 1bar respectively. The constant volume Heat addition is 1800 kJ/kg. Calculate the maximum temperature and pressure of the cycle and the temperature of the end of compression process. What are the efficiency and mean effective pressure (mep) of the cycle?. 12
Take Cv = 0718 kJ/kg K and $\gamma = 1.4$

(b) Explain flue gas analysis by Orsat apparatus. 8

6. (a) What is cut-off ratio? How does it affect thermal efficiency of Diesel cycle? 5

(b) Explain: (i) Enthalpy of reaction, (ii) Enthalpy of formation. 5

(c) Define system boundary and surrounding with suitable example and figure. 5

(d) Explain Joule's experiment. 5

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4| CBSGS| Sem III | ECCF | 28|11|2018

Subject Code: 49302 / ELECTRONIC CIRCUITS AND COMMUNATION FUNDAMENTALS

Q. P. Code: 35354

(3 Hours) [Total Marks : 80]

N.B. : 1. Question **ONE** is **Compulsory.**
2. Solve any **THREE** out of remaining.
3. **Draw** neat and **clean** Diagrams.
4. Assume suitable **data** if required

Q.1. Attempt the following
a) Explain the construction of n-channel JFET 5
b) List the ideal Characteristics of Op-amp 5
c) What is modulation in communication?What is the need for modulation? 5
d) Compare TDM and FDM 5

Q.2. A. Explain Barkhausen Criteria for Oscillation. Calculate the frequency of oscillations of Colpitt's oscillator with $C_1 = C_2 = 500$ pF and L=1mH 10
B. Derive the equations for Zi,Zo,Av for common source configuration using voltage divider network 10

Q.3. A. Explain how op-amp can be used as averaging amplifier in inverting configuration 10
B. Explain generation of SSB using phase shift method. 10

Q.4. A. Explain Superheterodyne reciever in detail and show waveforms at each stage 10
B. State and proof Sampling theorem for Low pass Signal. 10

Q.5. A. Discuss Delta Modulation and Adaptive Delta Modulation 10
B. Write short note on TDM-PCM System 10

Q.6 . Write Short note on
a) PLL 10
b) Op-amp as Comparator 10

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Comp | CBCGS | sem III | DLDA | 28/11/2018

Paper / Subject Code: 50902 / Digital Logic Design and Analysis

Duration: - 3 Hours

Marks: 80 Marks

NB: - Question 1 is compulsory

Solve any three questions from the remaining.

1	a)	Convert decimal number 576.24 into binary, base-9, octal, hexadecimal system.	04
	b)	Construct hamming code for 1010 using odd parity.	04
	c)	Convert $(-89)_{10}$ to its equivalent Sign Magnitude, 1's Complement and 2's Complement Form	04
	d)	Perform $(BC5)_H - (A2B)_H$ without converting to any other base	04
	e)	Prove De Morgans theorem	04
2a.		Given the logic expression: $A + \overline{B}\overline{C} + AB\overline{D} + ABCD$ 1. Express it in standard SOP form. 2). Draw K-map and simplify. 3). Draw logic diagram using NOR gates only.	10
2b.		Reduce using Quine McClusky method & realize the operation using only NAND gates. $F(A,B,C,D) = \prod M(0,2,3,6,7,8,9,12,13)$.	10
3a.		Design a 4-bit binary to gray code converter.	10
3b.		Design a 4-bit BCD adder using IC 7483 and necessary gates.	10
4a.		Implement the following logic function using all 4:1 multiplexers with the select inputs as 'B', 'C', 'D', 'E' only. $F(A,B,C,D,E) = \sum m\,(0,1,2,3,6,8,9,10,13,15,17,20,24,30)$	10
4b.		Convert a SR flip flop to J K flip flop	10
5a.		Design a mod-6 synchronous counter using T FF	10
5b.		Explain the operation of 4-bit universal shift register.	10
6		Write short notes on any two	20
	a.	VHDL	
	b.	TTL and CMOS logic families	
	c.	4-bit Magnitude comparator	
	d.	3 to 8 line decoder	

Comp | Sem III | CBCGS | DS | 4/12/2018

Paper / Subject Code: 50903 / Discrete Structures QP CODE : 40416

[Total Marks: 80]

(3 Hours)

N.B (1) Question No. 1 is compulsory.
(2) Solve any three questions out of remaining five questions.
(3) Assumptions made should be clearly stated.
(4) Figures to the right indicate full marks.

Q.1 (a) Two dice are rolled, find the probability that the sum is [6M]
(i)Equal to 1 (ii) Equal to 4 (iii) Less than 13

(b) Use the laws of logic to show that [6M]
$[(p \rightarrow q) \wedge \neg q] \rightarrow \neg p$ is a tautology

(c) Determine the matrix of the partial order of divisibility on the set A.Draw the Hasse diagram of the Poset.Indicate those which are chains [8M]
(1) A={1,2,3,5,6,10,15,30}
(2) A={3,6,12,36,72}

Q.2 (a) Find the complement of each element in D_{42}. [6M]

(b) Let Q be the set of positive rational numbers which can be expressed in the form $2^a 3^b$, where a and b are integers .Prove that algebraic structure (Q, .) is a group. Where . is multiplication operation. [6M]

(c) Define isomorphic graphs .Show whether the following graphs are isomorphic or not . [8M]

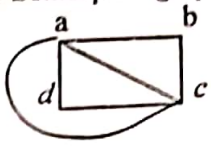

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Fig (a)

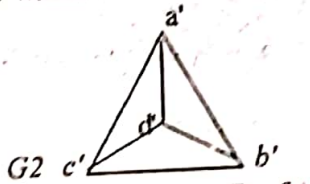
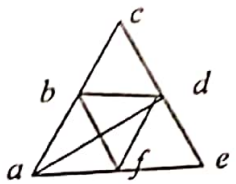
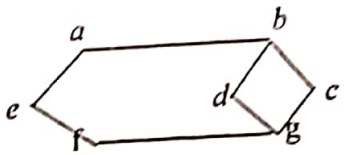


Fig (b)

Q.3 (a) Determine which of the following graph contains an Eulerian or Hamiltonian circuit. [6M]



Fig(a)



Fig(b)

(b) For all sets A, X and Y show that [6M]
$A \times (X \cap Y) = (A \times X) \cap (A \times Y)$

(c) Let $f(x) = x+2$, $g(x) = x-2$ and $h(x) = 3x$ for $x \in R$,Where R= Set of real numbers. Find [8M]
(g, f) , (f , g) ,(f , f), (g , g) ,(f , h),(h, g),(h , f) ,(f , h , g)

Q.4 (a) Let R is a binary relation. Let S = {(a, b) | (a, c)∈ R and (c, b) ∈ R for some c} Show that if R is an equivalence relation then S is also an equivalence relation. [6M]

[TURN OVER

(b) Determine the generating function of the numeric function a_r, where [6M]

(i) $a_r = 3^r + 4^{r+1}$, $r \geq 0$
(ii) $a_r = 5$, $r \geq 0$

(c) Consider the (3, 6) encoding function $e: B^3 \rightarrow B^6$ defined by [8M]
$e(000) = 000000$ $e(001) = 001100$ $e(010) = 010011$ $e(011) = 011111$
$e(100) = 100101$ $e(101) = 101001$ $e(110) = 110110$ $e(111) = 111010$
Decode the following words relative to a maximum likelihood de coding function.
(i) 000101 (ii) 010101

Q.5 (a) Determine the number of positive integers n where $1 \leq n \leq 100$ and n is not divisible by 2, 3 or 5. [6M]

(b) Use mathematical induction to show that [6M]
$1+5+9+\ldots\ldots\ldots+(4n-3) = n(2n-1)$

(c) Find the greatest lower bound and least upper bound of the set {3, 9, 12} and {1, 2, 4, 5, 10} if they exists in the poset $(z^+, /)$. Where / is the relation of divisibility. [8M]

Q.6 (a) Let $A = \{1,2,3,4\}$ and Let $R = \{(1,1)\ (1,2)\ (1,4)\ (2,4)\ (3,1)\ (3,2)\ (4,2)\ (4,3)\ (4,4)\}$. Find transitive closure by Warshall's algorithm. [6M]

(b) Let $H = \{[0]_6, [3]_6\}$ find the left and right cosets in group Z_6. Is H a normal subgroup of group Z_6. [6M]

(c) Find the complete solution of the recurrence relation [8M]
$a_n + 2a_{n-1} = n+3$ for $n \geq 1$ and with $a_0 = 3$

Comp | CBSGS | sem III | DS | 4/12/2018

Paper / Subject Code: 49303 / DATA STRUCTURES

Duration: 3 hrs **Total Marks: 80**

N.B: (1) Question No. 1 is Compulsory
(2) Attempt any three questions of the remaining five questions
(3) Figures to the right indicate full marks
(4) Make suitable assumptions wherever necessary with proper justifications

1. (a) What is a data structure? Explain with examples. (05)
(b)What are the advantages of using dynamic memory allocation over static memory allocation? (05)
(c) Describe Multiway Search Tree with an example. (05)
(d) Write a function in C to implement Shell Sort. (05)

2. (a) Discuss file I/O operations in C programming language. (10)
(b)Explain sparse matrix as application of linked list with examples. (10)

3. (a) How can we use the QUEUE data structure for simulation? Explain with an example. (10)
(b)Write a function to implement Radix Sort. Sort the following numbers using Radix Sort: 25, 10, 68, 19, 75, 43, 22, 31, 11, 59. Show output after each pass. (10)

4. (a) Write a C program to implement a Circular Linked List which performs the following operations: (12)
   (i) Inserting element in the beginning
   (ii) Inserting element in the end
   (iii) Inserting element after an element
   (iv) Deleting a particular element
   (v) Displaying the list
   (b) Apply Huffman Coding for the word "MALAYALAM". Give the Huffman code for each symbol. (08)

5. (a) Explain any one application of stack with an example. (08)
(b)Write a program in C to delete a node from a Binary Search Tree. The program should consider all the possible cases. (12)

6. (a) Write a program in C to implement the BFS traversal of a graph. Explain the code with an example. (10)
(b) Hash the following in a table of size 11. Use any two collision resolution techniques: (10)
23, 55, 10, 71, 67, 32, 100, 18, 10, 90, 44.

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comp | Sem III | CBSGS | DLDA | 11/12/18

Paper / Subject Code: 49304 / DIGITAL LOGIC DESIGN AND ANALYSIS

Time: 3 Hours **Marks: 80**

N.B. (1) Question No. 1 is compulsory
(2)Assume suitable data if necessary
(3)Attempt any three questions from remaining questions

1
(a) Convert $(47.3)_7$ to BCD, Excess-3 and gray code. (3)
(b) Perform $(2F9)_H - (1AD)_H$ without converting to any other base. (3)
(c) Subtract $(64)_{10} - (31)_{10}$ using 2's complement. (4)
(d) Explain race around condition. (4)
(e) Prove OR-AND configuration is equivalent to NOR-NOR configuration. (4)
(f) Obtain hamming code for data 1101. (2)

2 (a) Simplify following function using Quine McCluskey method and realize circuit using basic gates. (10)
$F(A,B,C,D) = \sum m(0,1,3,5,7,9,11,15) + d(2,14)$
(b) Design 1-bit magnitude comparator. (10)

3 (a) Compare different logic families with respect to fan in, fan out, speed, propogation delay and power dissipation. (5)
(b) Simplify $Y = \overline{A}\,\overline{B}\,\overline{C} + A\,\overline{B}\,\overline{C} + A\,\overline{B}\,C$ (5)
(c) Implement the following using only one 8:1 Mux and few gates. (10)
$F(A,B,C,D) = \sum m(0, 1, 5, 7, 9, 10, 15)$

4 (a) Convert D flip-flop to JK flip-flop and JK flip-flop to D flip-flop. (10)
(b) Design a full adder using only NAND gates. (10)

5 (a) Design mod -6 asynchronous UP counter. (10)
(b) Write short note on VHDL . (10)

6 (a) Explain Astable and Bistable multivibrators. (10)
(b) Explain 4-bit bidirectional shift register. (10)

Comp | Sem III | CBCGS | ECCF | 11 | 12 | 18

Paper / Subject Code: 50904 / Electronics Circuits and Communication Fundamentals

Q. P. Code : 26300

(3 Hours) **(Total Marks: 80**

N.B. : 1. Question **ONE** is **compulsory**.
2. Solve any **THREE** out of remaining questions.
3. **Draw** neat and **clean diagrams.**
4. Assume suitable **data if required.**

Q. 1. A. Explain the concept and significance of CMRR and Slew Rate in case of op-amps. **5**

B. Given β=120 and I_E= 3.2 mA for a common-emitter configuration with $r_0=\infty\ \Omega$, determine:

(a) Z_i

(b) A_v if a load of 2 kΩ is applied. **5**

(c) A_i with the 2 kΩ load. **5**

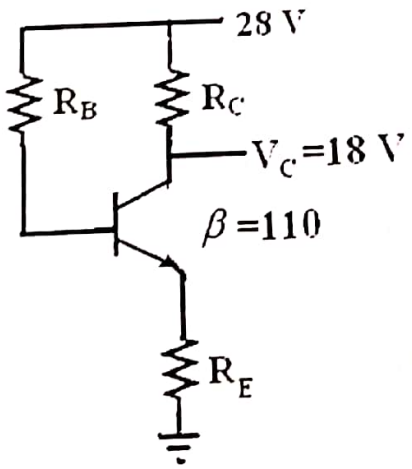
C. Discuss the factors that influence modulation index of an FM wave. **5**

D. Justify that adaptive delta modulation superior to delta modulation. **5**

Q. 2 A. The emitter bias configuration as shown in following figure has the specifications:

$I_{CQ} = \frac{1}{2} I_{Csat}$ $I_{Csat} = 8\ mA$ $V_C = 18\ V$ and $\beta = 110$

Determine R_C, R_E and R_B. **10**



B. Explain how op-am can be used comparator and zero crossing detector. **10**

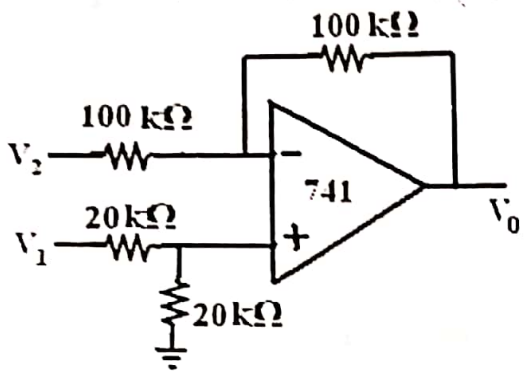
Q. 3 A. What is the source of the leakage current in a transistor?

If the emitter current of a transistor is 8 mA and I_B is 1/100 of I_C, determine the levels of I_C and I_B. 5

B. Draw and explain Colpitts oscillator. 5

C. Explain principle of FDM. 5

D. Determine the output voltage for the circuit if V_1=5V and V_2=3V



5

Q. 4 A. What is DSBSC wave and explain its generation using balanced modulator. 10

B. What is multiplexing in communication system? Draw block diagram of TDM-PCM system and explain. 10

Q. 5 A. State Shannon's theorem on channel capacity.

What is the maximum capacity of a perfectly noiseless channel whose bandwidth is 120 Hz, in which the values of the data transmitted may be indicated by any one of the 10 different amplitudes? 10

B. With respect to neat diagram explain the elements of analog communication system. 10

Q. 6 A. What is meant by Nyquist rate in sampling and explain its significance. 5

B. Give the proper definition for entropy and information rate. 5

C. Write short note on op-amp as differentiator. 5

D. Differentiate between Class A and Class C power amplifiers with respect to circuit diagram, operating cycle and power efficiency. 5

Paper / Subject Code: 50905 / Data Structures

COMP/ III/ CBCGS/ DS/ 17-12-18

Q.P.Code:36286

Duration: 3 Hours **Total Marks: 80**

N.B: (1) Question No. 1 is Compulsory
(2) Attempt any **three** questions of the remaining **five** questions
(3) **Figures** to the **right** indicate **full** marks
(4) Make suitable assumptions wherever necessary with proper justifications

1. (a) What are various operations possible on data structures? **(05)**
   (b)What are different ways of representing a Graph data structure on a computer? **(05)**
   (c) Describe Tries with an example. **(05)**
   (d) Write a function in C to implement binary search. **(05)**

2. (a) Use stack data structure to check well-formedness of parentheses in an algebraic expression. Write C program for the same. **(10)**

   (b)Given the frequency for the following symbols, compute the Huffman code for each symbol. **(10)**

Symbol	A	B	C	D	E
Frequency	24	12	10	8	8

3. (a) Write a C program to implement priority queue using arrays. The program should perform the following operations: **(12)**
   i. Inserting in a priority queue
   ii. Deletion from a queue
   iii. Displaying contents of the queue
   (b) What are expression trees? What are its advantages? Derive the expression tree for the following algebraic expression: (a + (b/c)) * ((d/e) – f) **(08)**

4. (a) Write a C program to represent and add two polynomials using linked list. **(12)**
   (b) How does the Quicksort technique work? Give C function for the same. **(08)**

5. (a) What is a doubly linked list? Give C representation for the same. **(05)**

   (b) Given the postorder and inorder traversal of a binary tree, construct the original tree: **(10)**
   Postorder: D E F B G L J K H C A
   Inorder: D B F E A G C L J H K
   (c) What is hashing? What properties should a good hash function demonstrate? **(05)**

6. (a) Given an array int a[] = {69, 78, 63, 98, 67, 75, 66, 90, 81}. Calculate address of a[5] if base address is 1600. **(02)**

   (b) Give C function for Breadth First Search Traversal of a graph. Explain the code with an example. **(10)**

   (c) Write a C program to implement a singly linked list. The program should be able to perform the following operations: **(08)**

   (i) Insert a node at the end of the list
   (ii) Deleting a particular element
   (iii) Display the linked list

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