Examination:	May-June 2018	**Date:**	8/6/2018
Branch:	Computer Engineering	**Subject:**	AM-III
Class/SEM:	SE/III	**Paper Code:**	21236

Examination:	May-June 2018	**Date:**	8/5/2018
Branch:	Computer Engineering	**Subject:**	AM-III
Class/SEM:	SE/III	**Paper Code:**	23005

Examination:	May-June 2018	**Date:**	16-5-18
Branch:	Computer Engineering	**Subject:**	DLDA
Class/SEM:	SE/III	**Paper Code:**	35366

Examination:	May-June 2018	**Date:**	16-5-18
Branch:	Computer Engineering	**Subject:**	SCCF
Class/SEM:	SE/III	**Paper Code:**	23887

Examination:	May-June 2018	**Date:**	22-5-18
Branch:	Computer Engineering	**Subject:**	DS
Class/SEM:	SE/III	**Paper Code:**	24788

Examination:	May-June 2018	**Date:**	22-5-18
Branch:	Computer Engineering	**Subject:**	DS
Class/SEM:	SE/III	**Paper Code:**	25227

Examination:	May-June 2018	**Date:**	1/6/2018
Branch:	Computer Engineering	**Subject:**	DS
Class/SEM:	SE/III	**Paper Code:**	40418

Examination:	May-June 2018	**Date:**	1/6/2018
Branch:	Computer Engineering	**Subject:**	DS
Class/SEM:	SE/III	**Paper Code:**	36288

Examination:	May-June 2018	**Date:**	2/6/2018
Branch:	Computer Engineering	**Subject:**	ECCF
Class/SEM:	SE/III	**Paper Code:**	35355

Examination:	May-June 2018	**Date:**	2/6/2018
Branch:	Computer Engineering	**Subject:**	DLDA
Class/SEM:	SE/III	**Paper Code:**	38996

Examination:	May-June 2018	**Date:**	7/6/2018
Branch:	Computer Engineering	**Subject:**	OOPM
Class/SEM:	SE/III	**Paper Code:**	403342

COMP / TE / EBCHS / AM-III / 8/5/18

Q. P. Code: 21236

Marks: 80

Time: 3 Hours

Note: 1) Q.1 is **COMPULSORY.**

2) Attempt **ANY 3 questions** from Q.2 to Q.6

3) Use of scientific calculators allowed.

4) Figures to right indicate marks.

Q.1 a) Find the Laplace transform of $e^{-2t}\, t\, cost$ **(05)**

b) Find the inverse Laplace transform of $\frac{3s+7}{s^2-2s-3}$ **(05)**

c) Determine whether the function $f(z) = (x^3 + 3xy^2 - 3x) + i(3x^2y - y^3 + 3y)$ is analytic and if so find its derivative. **(05)**

d) Find the Fourier series for $f(x) = x^2$ in the interval $(-\pi, \pi)$. **(05)**

Q.2 a) Evaluate $\int_0^\infty \left(\frac{sin2t + sin3t}{t\, e^t}\right) dt = \frac{3\pi}{4}$ **(06)**

b) Find the Z- Transform of $\left\{\left(\frac{1}{4}\right)^{|k|}\right\}$ **(06)**

c) Show that the function $v = e^x(x\, siny + y\, cosy)$ is a harmonic function. Find its harmonic conjugate and corresponding analytic function. **(08)**

Q.3 a) From 8 observations the following results were obtained. **(06)**

$\sum x = 59$; $\sum y = 40$; $\sum x^2 = 524$; $\sum y^2 = 256$; $\sum xy = 364$.

Find the equation of the line of regression of x on y and the coefficient of correlation.

b) Find the bilinear transformation which maps the points z = -1 , 0 , 1 onto the points w = -1, -*i*, 1. **(06)**

c) Obtain half-range sine series for $f(x) = (x-1)^2$ in $0 < x < 1$.
Hence find $\sum_{n=1}^{\infty} \frac{1}{n^2}$ **(08)**

Q.4 a) Find the inverse Laplace Transform by using convolution theorem $\frac{1}{(s^2+a^2)(s^2+b^2)}$ **(06)**

b) Compute Spearman's Rank correlation coefficient for the following data: **(06)**

X	85	74	85	50	65	78	74	60	74	90
Y	78	91	78	58	60	72	80	55	68	70

c) Find the inverse Z-transform for the following; (08)

i) $\frac{1}{(z-5)^2}$, $|z| < 5$ ii) $\frac{z}{(z-2)(z-3)}$, $|z| > 3$

Q.5 a) Using Laplace Transform evaluate $\int_0^\infty e^{-t}\,(1+3t+t^2)\,H(t-2)\,dt$ (06)

b) Prove that $f_1(x) = 1$; $f_2(x) = x$; $f_3(x) = \left(\frac{3x^2-1}{2}\right)$ are orthogonal over (-1, 1). (06)

c) Solve using Laplace transform $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 2y = 2e^{3x}$, $y = 2$, $y' = 3$ at $x = 0$. (08)

Q.6 a) Find the complex form of Fourier series for $f(x) = e^x$, $(-\pi, \pi)$ (06)

b) If u , v are harmonic conjugate functions, show that uv is a harmonic function. (06)

c) Fit a straight line of the form $y = a + bx$ to the following data and estimate the value of y for $x = 3.5$ (08)

x	0	1	2	3	4
Y	1	1.8	3.3	4.5	6.3

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CBSGS / I.T / Sem IV / AM-II / 08/05/18

1 COMP

L 1 B

Q.P. Code :23005

[Time: Three Hours] **[Marks:80]**

Please check whether you have got the right question paper.

N.B:
1. Question no. 1 is compulsory.
2. Attempt any three of the remaining.
3. Figures to the right indicate full marks.

Q.1 a) Find the Laplace transform of e^{-4t} sinh t sin t. 05

b) Find half-range sine series for $f(x) = \frac{\pi}{4}$ in $(0, \pi)$. 05

c) Find the values of Z for which the following function is not analytic.
Z= sin hu cos v + i cos hu sinv. 05

d) Show that $\nabla\left[\frac{(\bar{a}\cdot\bar{r})}{r^n}\right] = \frac{\bar{a}}{r^n} - \frac{n(\bar{a}\cdot\bar{r})\bar{r}}{r^{n+2}}$, where $\bar{a}$ is a constant vector. 05

.2 a) Find the inverse Z- transform of $F(z) = \frac{1}{(z-3)(z-2)}$ if $|z| < 2$. 06

b) Verify Laplace's equation for $u = \left(r + \frac{a^2}{r}\right)\cos\theta$ also find v and f(z). 06

c) Find the Fourier series for the periodic function 08

$$f(x) = \begin{cases} -\pi & -\pi < x < 0 \\ x, & 0 < x < \pi \end{cases}$$

State the value of f(x) at x=0 and hence, deduce that

$$\sum_{n=1}^{\infty} \frac{1}{(2n-1)^2} = \frac{\pi^2}{8}$$

a) Find $L^{-1}\left[\frac{1}{(s-3)(s-3)^2}\right]$ using convolution theorem. 06

b) Show that the set of functions sin x , sin 2x , sin 3x, ---------- is orthogonal on the interval $[0,\pi]$ 06

c) Verify Green's Theorem for $\int_C \bar{F}\cdot d\bar{r}$ where $\bar{F} = x^3 i + xyj$ and c is the triangle whose vertices are (0,2) , (2,0) and (4,2) . 08

Q.4

a) Find Laplace transform of $f(t) = \begin{cases} a \sin p\,t, & 0 < t < \frac{\pi}{p} \\ 0, & \frac{\pi}{p} < t < \frac{2\pi}{p} \end{cases}$ 06

and $f(t) = f\left(t + \frac{2\pi}{p}\right)$.

b) Show that $\bar{F} = (y^2-z^2+3yz-2x)i + (3xz+2xy)j + (3xy-2xz+2z)k$ is both solenoidal and irrotational. 06

c) Find half range cosine series for $f(x) = x$, $0<x<2$. 08

Hence deduce that $\frac{\pi^4}{90} = \frac{1}{1^4} + \frac{1}{2^4} + \frac{1}{3^4} + \frac{1}{4^4} + - - - - -$

Q.5

a) Show that $\iint_S (\nabla r^n).\, d\bar{s} = n(n+1) \iiint_V r^{n-2}\, dv$ using Gauss's Divergence theorem. 06

b) Find the Z-transform of $\{k^2 e^{-ak}\}$, $k \geq 0$. 06

c) (i) Find $L^{-1}\left[\frac{s^2+2s+3}{(s^2+2s+2)(s^2+2s+5)}\right]$ 08

(ii) Find $L^{-1}\left[\frac{s^2+a^2}{\sqrt{s+b}}\right]$

Q.6

a) Use Laplace transform to solve,
$\frac{d^2y}{dt^2} + 4\frac{dy}{dt} + 8y = 1$ where, $y(0) = 0$, $y'(0) = 1$ 06

b) Find the bilinear transformation which maps the points $z=\infty, i, 0$ onto the points $0, i, \infty$ respectively of w-plane. 06

c) Express the function $f(x) = \begin{cases} \frac{\pi}{2}, & for\ 0 < x < \pi \\ 0, & for\ x > \pi \end{cases}$ 08

for Fourier Sine Integral and Show that

$\int_0^\infty \frac{1-\cos\pi w}{w} \sin wx\, dw = \frac{\pi}{2}$ when $0<x<\pi$

**********All THE BEST**********

COMP | III | CBCGS | DLDA | 16/05/18

Q. P. Code: 35366

Duration:3 hours **Total marks:80**

N.S.: (1) Question No.1 is compulsory.
(2) Solve any three from remaining five questions.
(3) Figures to the right indicate full marks

Q. 1 Answer the following questions: (20)
(a)Write the entity declaration in VHDL for NOR gate.
(b) Add $(22)_{10}$ to $(56)_{10}$ in BCD.
(c) Convert decimal 57 into binary, base 7and Hexadecimal.
(d) Construct Hamming code for 1010.
(e) Perform subtraction using 2's complement for $(10)_{10}$-$(7)_{10}$
(f) State and prove De Morgan's law.
(g) Convert $(77)_{10}$ into Excess-3 code.
(h) Perform addition of $(34)_8$ and $(62)_8$
(i)Find 8's complement of the numbers $(37)_8$ and $(301)_8$
(j)Explain ASCII code in brief.

Q. 2(a) Simplify the following equation using K map to obtain SOP equation and realize the minimum equation using only NAND gates. (10)
$F(A,B,C,D)=\sum m(1,2,4,6,9,10,12,14)+d(3,7,13)$
(b) Implement full adder using 8:1 mux. (10)

Q. 3(a) Obtain the minimal expression using QuineMc-Cluskey method (10)
$F(A,B,C,D)=\sum m(1,2,3,5,6,10,11,13,14)+d(4,7)$
(b) What is race around condition? How to overcome it? (10)

Q. 4(a) Design 3 bit asynchronous counter and draw the timing diagram. (10)
(b)Convert JK flipflop to SR flipflop and D flipflop. (10)

Q. 5(a) Compare TTL and CMOS with respect to different parameters. (10)
(b)Explain the features of VHDL and its modeling styles. (10)

Q. 6 Write short notes on(any four) (20)
a) Moore and Mealy machine
b) Sequence generator
c) Universal shift register
d) Priority encoder
e) Carry look ahead adder

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Sem III / EBSCS / Comp / ECCF · 16/5/2018.

Q.P. Code: 23887

Time:-3 Hrs **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. Find the mathematical expression of FM signal **5**

B. With neat diagram explain Zero-Crossing Detector **5**

C. A public address system is connected to a microphone that has a maximum output voltage of 10mV. The microphone is connected to a 10 watt audio amplifier system that is driving an 8 Ohm speaker. The voltage amplifier is a noninverting op-amp circuit. Calculate the maximum voltage gain for the voltage amplifier stage and determine the resistor values to obtain the desired gain. Assume the power amplifier stage has a voltage gain is 1. **5**

D. Explain lock range and capture range. **5**

Q. 2 A. Sketch a block representation for an n-channel JFET, showing bias voltages, depletion regions, and current directions. Label the device terminals and explain its operation. Explain the effect of increasing levels of negative gate-source voltage. Also sketch a typical drain characteristics for VGS=0 for an n-channel JFET. Explain the shape of the characteristic, identify the regions, and indicate the important current and voltage levels. **10**

B. List down various parameters of Opamp along with their typical values for IC741. Also explain what the significance of CMRR and Slew Rate is? **10**

Q. 3 A. Explain how operational amplifier can be used for taking summation of three signals. **5**

B. Explain fly wheel effect in Class C amplifier. **5**

C. Explain Nyquist criteria. **5**

D. Determine the magnitude of g_m for a JFET with I_{DSS} = 8 mA and V_P= −4 V at dc bias points V_{GS}= −0.5 V and also at V_{GS}= −2.5 V. **5**

Q. 4 A. What is DSBSC wave? Explain its generation using balanced modulator. 10

B. Explain the use of PLL as FM detector. 10

Q. 5 A. Explain super heterodyne receiver in detail along with the waveforms at each stage. 10

B. What do you understand by signal multiplexing? Explain TDM and FDM with suitable examples. 10

Q. 6 A. Write short note on generation of FM by Armstrong method. 5

B. Mention important specifications of ADC and DAC required for communication. 5

C. Explain in detail what is meant by quantization noise. 5

D. Compare n-channel and p-channel JFET with respect to their device features and voltage-current characteristics. 5

COMP/III/CBSGS/DS/22-5-18

QP CODE : 24788

(3 Hours) Marks : 80

NB : (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 justification.

1. (a) Define data structure ? Give its classification. 5
(b) What are the advantages of using dynamic memory allocation over static memory allocation ? 5
(c) Describe Multiway Search Tree with an example. 5
(d) Write a function in C to implement Shell Sort. 5

2. (a) Discuss file I/O operations in C programming language. 8

(b) Write C program to perform polynomial addition using Linked List. 12

3. (a) What are different types of queues ? How can we use the queue data structure for simulation. 10

(b) Write a function to implement Radix Sort. Sort the following numbers using Radix Sort ; 10
25, 10, 68, 19, 75, 43, 22, 31, 11, 59. Show output after each pass.

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) Deleting the last 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. 8

5. (a) Write a program to evaluate postfix expression. 10
(b) Write a program in C to delete a node from a Binary Search Tree. The program should consider all the possible cases. 10

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

COMP/II/CBCGS/DS/22-5-18

Q.P. Code: 25227

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

1) Question **no.1** is **compulsory**.
2) Solve any **three** questions out of remaining **five** questions.
3) All questions carry equal marks as indicated by figures to the right.
4) Assume appropriate data whenever required. State all assumptions clearly.

Q.1 a) Prove by induction that the sum of the cubes of three consecutive numbers is divisible by 9. **(05M)**

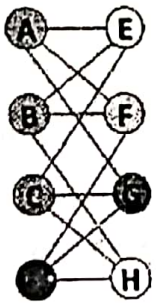
b) Find the generating function for the following finite sequences **(05M)**

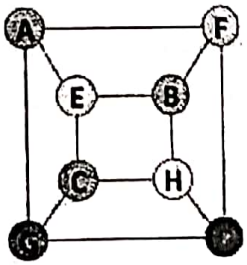
i) 2,2,2,2,2,2 ii) 1,1,1,1,1,1

c) A box contains 6 white balls and 5 red balls. In how many ways 4 balls can be drawn from the box if, i) they are to be of any color ii) all the balls to be of the same color. **(05M)**

d) Find the complement of each element in D_{30}. **(05M)**

Q.2 a) Define Isomorphism of graphs. Find if the following two graphs are isomorphic. If yes, find the one-to-one correspondence between the vertices. **(08M)**





b) In a certain college 4% of the boys and 1% of the girls are taller than 1.8 mts. Furthermore 60% of the students are girls. If a student selected at random is taller than 1.8 mts, what is the probability that the student was a boy? Justify your answer **(08M)**

c) Prove $\neg(p \vee (\neg p \wedge q))$ and $\neg p \wedge \neg q$ are logically equivalent by developing a series of logical equivalences.

Q. 3 a) Prove that set G = {1,2,3,4,5,6} is a finite abelian group of order 6 with respect to multiplication module 7. **(08M)**

b) Let A={1,2,3,4,5}, let R={(1,1),(1,2),(2,1),(2,2),(3,3),(3,4),(4,3),(4,4),(5,5)} and S={(1,1),(2,2),(3,3),(4,4),(4,5),(5,4),(4,5)} be the relations on A. Find the smallest equivalence relation containing the relation R and S. **(08M)**

c) Test whether the following function is one-to-one, onto or both. (04M)

f: Z→Z, $f(x)=x^2+x+1$

Q.4 a) Show that the (2,5) encoding function $e:B^2 \rightarrow B^5$ defined by (08M)

e(00)=00000 e(01)=01110

e(10)=10101 e(11)=11011 is a group code.

How many errors will it detect and correct?

b) Let H=

$$\begin{vmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{vmatrix}$$

Be a parity check matrix. Determine the group code $e_H:B^3 \rightarrow B^6$ (08M)

c) How many friends must you have to guarantee that at least five of them will have birthdays in the same month? (04M)

Q.5 a) Let G be a set of rational numbers other than 1. Let * be an operation on G defined by a*b=a+b-ab for all a,b €G. Prove that (G,*) is a group.

b) Solve $a_r-7a_{r-1}+10a_{r-2} = 6+8r$ given $a_0= 1$, $a_1=2$ (08M)

c) Let A={a,b,c,d,e,f,g,h}. Consider the following subsets of A (04M)

A1={a,b,c,d} A2={a,c,e,g,h}

A3={a,c,e,g} A4={b,d} A5={f,h}

Determine whether following is partition of A or not. Justify your answer.

i) {A1, A2} ii) {A3, A4, A5}

Q.6 a) Draw the Hasse Diagram of the following sets under the partial order relation divides and indicate which are chains. Justify your answers. (08M)

I. A={2,4,,12,24}

II. A={1,3,5,15,30}

b) Let the functions f,g, and h defined as follows: (08M)

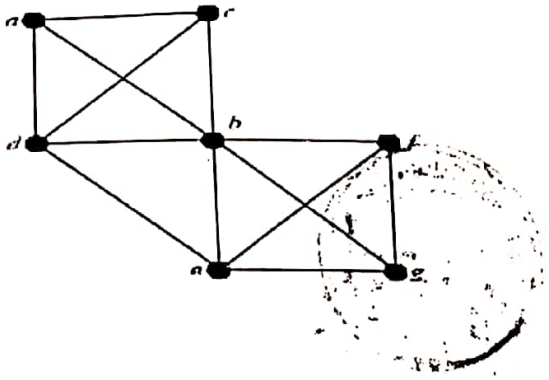
f:R→R, f(x)=2x+3

g: R→R, g(x)=3x+4

h: R→R, h(x)=4x

Find gof, fog, foh, , gofoh

c) Determine Euler Cycle and path in graph shown below (04M)



comp] sem III / CBSGS / DS/ 110618 **QP CODE : 40418**

(3 Hours) **Max. Marks: 80**

1) Question **No.1** is **compulsory.**
2) Solve any **three** questions out of remaining **five** questions.
3) All questions carry **equal** marks as indicated by figures to the right.
4) Assume appropriate data whenever required. State all assumptions clearly.

Q.1 a) Use mathematical induction to show that (05M)

$1+2+3...+n=n\ (n+1)/2$ for all natural number values of n.

b) Draw Hasse Diagram for following relation, what the diagram is called as? Justify.

Let A={a,b,c,d,e} and

R={(a,a),(b,b),(c,c),(d,d),(e,e),(a,b),(b,c)(c,d),(d,e),(a,c),(a,d),(a,e),(b,d),(b,e),(c,e)} (05M)

c) Let the universal set U={1,2,3,...,10}

Let A={2,4,7,9} B={1,4,6,7,10} and C={3,5,7,9}

Find 1) AUB 2)A∩B 3) B∩C 4) (A∩B)UC 5)(BUC) ∩C (05M)

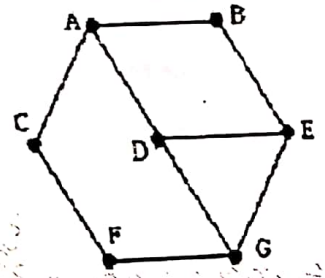
d) Consider set G = {1,2,3,4,5,6} under multiplication module 7 (05 M)

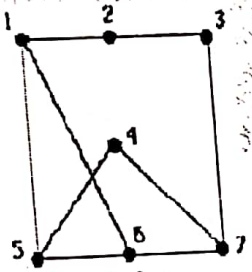
I. Find the multiplication table of the above.
II. Prove that it is a cyclic group

Q.2 a) Test whether the following function is one-to-one, onto or both. (04M)

$f: Z \rightarrow Z, f(x)=x^2+x+1$

b) Define Isomorphic Graphs. Find if the following two graphs are isomorphic. If yes give their one-to-one correspondence. (08 M)





c) Prove that set G = {0,1,2,3,4,5} is a finite abelian group of order 6 with respect to addition modulo 6. (08M)

Q.3 a) Explain Extended Pigeonhole Principle. How many friends must you have to guarantee that at least five of them will have birthdays in the same month. (04 M)

b) Show that the (3,6) encoding function $e:B^3 \rightarrow B^6$ defined by (08 M)

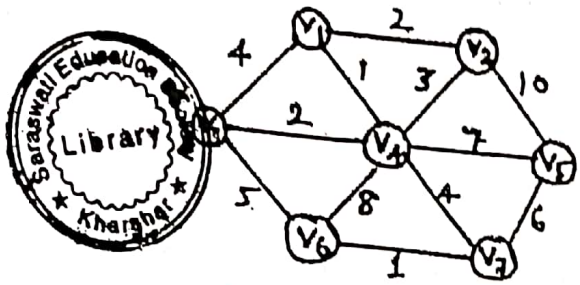
e(000)=000000 e(001)=000110
e(010)=010010 e(011)=010100
e(100)=100101 e(101)=100011
e(110)=110111 e(111)=110001 is a group code.

c) Let the functions f,g, and h defined as follows: (08 M)

f:R→R, f(x)=2x+3
g: R→R, g(x)=3x+4
h: R→R, h(x)=4x
Find gof, fog, foh, , gofoh

Q.4 a) Define R on Z as aRb iff (a-b) is a non-negative even integer. Check if R is a partially ordered relation. (04 M)

b) Find Minimum spanning tree for the following graph using Prim's Algorithm. (08 M)



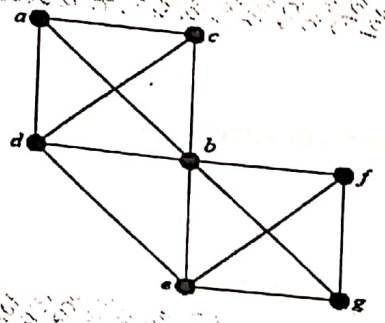
c) Solve $a_r - a_{r-1} - 6a_r = -30$ given $a_0 = 20$, $a_1 = -5$

Q.5 a) Find the generating function for the following finite sequences (08 M)

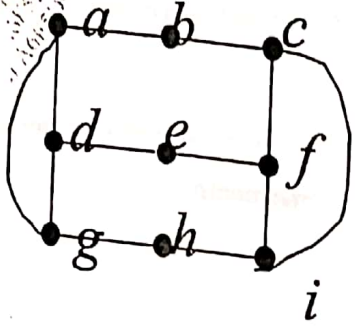
i) 2,2,2,2,2,2 ii) 1,1,1,1,1,1

b) i) Determine Hamiltonian Cycle and path in graph shown in (a) (04M)

ii) Determine Euler Cycle and path in graph shown in (b) (08 M)



(a)



(b)

State principle of inclusion and exclusion for three sets. A software company is looking to expand, anda firm is hired to help them find the necessary talent. The programmers must know the computer languages Java and Python. The firm receives 87 applications. Luckily, 75 applications indudeknowledge of at least one of the languages. As it comes to pass, 48 applicants know Python, which is a good start, but 31 applicants do not know Java. How many people know both languages? Justify your answer with an appropriate Venn diagram. (08M)

Q.6 a) Prove pΛ(qVr) and (pΛq)V(pΛr) are logically equivalent. (04M)

b) Let H=

1	0	0
0	1	1
1	1	1
1	0	0
0	1	0
0	0	1

Be a parity check matrix. Determine the group code $e_H: B^3 \rightarrow B^6$ (08 M)

c) Let G be a set of rational numbers other than 1. Let * be an operation on G defined by a*b=a+b-ab for all a,b €G. Prove that (G,*) is a group. (08 M)

Comp / Sem III / CBCGS / DS / 11/05/18

Q.P.Code:36288

Time: 3 Hours

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

Q.1 (a) Explain different types of data structures with example (05)
(b) What is a graph? Explain methods to represent graph. (05)
(c) Write a program in 'C' to implement Merge sort. (10)

Q.2 (a) Write a program in 'C' to implement QUEUE ADT using Linked-List. Perform the following operations: (10)
(i) Insert a node in the Queue.
(ii) Delete a node from the Queue
(iii) Display Queue elements

(b) Using Linear probing and Quadratic probing, insert the following values in the hash table of size 10. Show how many collisions occur in each iteration: 28, 55,71,67,11,10,90,44 (10)

Q.3 (a) Write a program in 'C' to evaluate postfix expression using STACK ADT (10)
(b) Explain different types of tree traversals techniques with example. Also write recursive function for each traversal technique. (10)

Q.4 (a) State advantages of Linked-List over arrays. Explain different applications of Linked-list (10)

(b) Write a program in 'C' to implement Circular queue using arrays. (10)

Q.5 (a) Write a program to implement Singly Linked List. Provide the following operations: (10)
(i) Insert a node at the specified location.
(ii) Delete a node from end
(iii) Display the list

(b) Insert the following elements in AVL tree: 44, 17, 32, 78, 50, 88, 48, 62, 54. Explain different rotations that can be used. (10)

Q.6 Explain the following (any two) (20)
(a) Splay Tree and Trie
(b) Graph Traversal Techniques
(c) Huffman Encoding
(d) Double Ended Queue

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Comp | Sem III | CBCGS | EC & CF | 216 | 2018

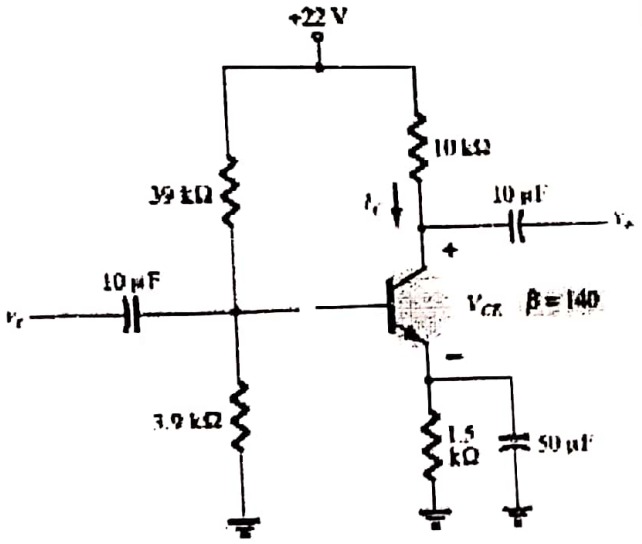
Q.P. Code: 35355

Duration:3 hours **Total marks:80**

(1) Question No.1 is compulsory.
(2) Solve any three from remaining five questions.
(3) Figures to the right indicate full marks

1. A. Draw input & output characteristics of BJT. State significance of DC load line. 5
   B. For an AM DSBFC modulator with carrier frequency fc = 100kHz and a maximum modulating signal frequency fm=5kHz, determine 5
      i) Frequency limits for the upper and lower side bands
      ii) Bandwidth
      iii) Draw the frequency spectrum
   C. Write a note on zero crossing detector using op-amp with waveforms 5
   D. Compare Class A and Class C Amplifiers 5

2. A. Explain Superheterodyne receiver with suitable diagram 5
   B. Implement summing Operational Amplifier using inverting configuration of Op-amp 5
   C. For the emitter bias network of figure below, determine: 10
      (a) I_b. (b) I_c. (c) V_{ce}. (d) V_c. (e) E_{th} (f) R_{th}



3. A. Explain generation of DSBSC using balanced Modulator along with its frequency and power spectrum 10
   B. With suitable waveforms explain how Op-amp can be used as Differentiator 10

4. A.For an AM DSBFC envelope with V_{max}= 20V and V_{min}= 4V; determine: 10
      i. Peak amplitude of USF AND LSF
      ii. Peak amplitude of carrier
      iii. Peak change in the amplitude of envelope
      iv. Modulation coefficient
      v. Draw the AM Envelope

B. Differentiate between TDM and FDM
C. State Shannon's Theorem and explain its significance

Q5. A. Draw PAM, PWM and PPM waveforms in time domain using a sinusoidal signal and explain in brief.

B. Define and explain in brief Amount of information, average information, information rate and Channel capacity of a communication system

Q6. A. State significance of modulation in Communication
B. Write a note on Pulse Code Modulation with waveforms
C. Explain and give ideal values of following parameters of an Op-Amp:
i. CMRR
ii. Slew rate
iii. Offset voltage
iv. Input Resistance
v. Output Impedance

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OMP / Sem III / EBSGS / DLDA / 2/6/18

Q.P.Code: 38996

(3 Hours) [Total 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 $(1473.45)_{10}$ into octal, binary and hexadecimal. (3)
(b) Add $(57)_{10}$ and $(26)_{10}$ in BCD. (3)
(c) Prove OR-AND configuration is equivalent to NOR-NOR configuration. (4)
(d) Subtract using 1's and 2's complement method $(15)_{10} - (21)_{10}$ (4)
(e) Encode the data bits 0 1 0 1 into a seven bit even parity Hamming code. (2)
(f) Prove NAND as universal gate. (2)
(g) Define a redundant group. (2)

2 (a) Given the logic expression: (10)
$AB + A\bar{C} + C + AD + A\bar{B}C + ABC$
1. Express in standard SOP.
2. Draw the K-map for the equation
3. Minimize and realise using NAND gates only.
(b) Design 2-bit magnitude comparator. (10)

3 (a) Design a logic circuit to convert BCD to Gray code. (10)
(b) Implement a full adder using demultiplexer. (10)

4 (a) Compare different logic families with respect to fan in, fan out, speed, propogation delay and power dissipation. (5)
(b) Design 16:1 Multiplexer using 4:1 Multiplexer. (5)
(c) Explain 4 bit bidirectional shift register. (10)

5 (a) Design mod 12 asynchronous down counter. (10)
(b) Convert D flipflop to JK flipflop and SR flipflop. (10)

6 Write short note on (any four):- (20)
(a) Multivibrators
(b) VHDL
(c) Race around condition
(d) State table
(e) Ring Counter

comp | 17 / Sem III / CBSGS / OOPM / 07/06/17

QP CODE : 40342

(3 Hours) **Marks : 80**

N.B 1) Question **no. 1 is compulsory.**

2) Attempt **any three from remaining** questions.

Q. 1 **a** What is the need for constructor in a class ? **[10]**

Develop a class circle with instance variable radius that is initialized using constructor. Create 2 methods in the class to calculate area and perimeter of circle.

b Explain static data members and methods in a class **[5]**

c Compare method overloading and overriding with an example each. **[5]**

Q. 2 **a** Explain different types of relationships among entities. **[10]**

Define the relationships among the objects of given sentences:

1) Customer has Account.
2) CurrentAccount, SavingsAccount is a kind of Account.
3) Customer makes payment

b What is a thread?Which are the two ways to create a thread? **[10]**

Write a program to show interleaving of actions from 2 thread: t1 and t2 synchronizing on a shared object.

t1 print message "ping" and t2 print message "pong".

Q. 3 **a** An online shopping application requires a customer to have an account. Each customer has unique id and is linked to exactly one account. Account owns shopping cart and orders. Customer has to register as a web user and can make only online purchases. Every user has a login name which is unique. User could have multiple states, new, active, temporary blocked or banned and is linked to shopping cart. Shopping cart belongs to account. Customer add products to shopping cart and then create order. Each order has order status. Both order and shopping cart have line items linked to a specific product. There is payment associated with every order. **[10]**

Draw class diagram for the given scenario. Show the class attributes and methods and class relationships.

b Explain different types of coupling and cohesion **[10]**

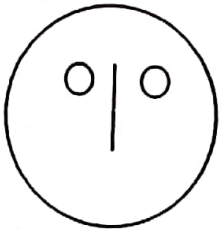
Q. 4 a How does do-while construction differ from that of while loop? [10]

Write a program that has 2 methods. The first method reads a list of numbers terminated by -999 into an ArrayList. The second method displays the second largest value in the list.

b What is checked and unchecked exception in Java? Explain the use of following in exception handling. [5]

Try-Catch, Finally, Throw, Throws

c Write an applet program to display [5]



Q. 5 a Explain creation of user defined package with an example. [10]

b Implement a class AnotherRectangle that extends Rectangle class and overrides the equals(...) method inherited from Object. Implement equals(...) so that 2 objects belonging to AnotherRectangle are equal if they agree in both length and width. [10]

Set length and width of rectangle using constructor.

Q. 6 a Differentiate between interface and abstract class. [10]

b Write short note on access specifiers. [5]

c Explain "write once and run anywhere" nature of Java. [5]
