UNIVERSITY OF PUNE

[4362]-213

S. E. (Computer and I.T) Examination - 2013

Digital Electronics and Logic Design

(2008 Pattern)

Total No. of Questions : 12 **[Total No. of Printed Pages :3]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1) Answer Q1 or Q2, Q3 OR Q4, Q5 OR Q6, From section I and Q7 OR Q8, Q9 OR Q10, Q11 OR Q12 From section II.

(2) Answers to the ***two sections*** *should be written in* ***separate answer-books****.*

(3) Neat diagrams must be drawn wherever necessary.

(4) Black figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

SECTION-I

Q1.

a) With the help of Quine-McCluskey method, determine the prime implicants for the following equation:
$F(A,B,C,D) = \sum m(0,1,2,5,6,7)$ [8]

b) Convert the following decimal numbers into their equivalent hexadecimal numbers and octal numbers.
(1) 936 (2) 1507 (3) 23.56 (4) 1.025 (5) 100.5 [10]

OR

Q2.

a) Minimize the following functions and realize using minimum number of logic gates.
$F_1 = \sum m(0,3,5,6,9,10,12,15)$
$F_2 = \sum m(0,1,2,3,11,12,14)$ [8]

b) Convert the following hexadecimal numbers into their equivalent octal numbers and binary numbers.
(1) A72E (2) BD6.7 (3) 0.AF54 (4) DF (5) FF [10]

Q3.

a) Explain the standard TTL characteristics in detail [8]

b) Draw and explain the working of 2-input CMOS NOR gate. [8]

OR

Q4.

a) Why is it necessary to interface between TTL and CMOS? Draw and explain the circuit arrangement of interfacing CMOS gate to number of TTL gates. [8]

b) Explain with the help of circuit diagram 2-input TTL NAND gate with Totem Pole output driver [8]

Q5.

a) Design and implement BCD to Excess-3 code converter using dual 4:1 multiplexers and some logic gates. [8]

b) Design 8-bit comparator using IC-7485 [8]

OR

Q6.

a) Design and implement BCD to Excess-3 code converter using required logic gates. Show truth table K-maps and circuit diagram of your design [8]

b) Draw and explain 4-bit BCD subtractor using IC 7483. Explain the operation on BCD numbers: 5-7. [8]

SECTION-II

Q7.

a) What is MOD counter? Draw the internal structure of IC 7490. Design MOD 56 counter using IC 7490 & necessary logic gates. [10]

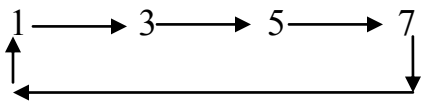
b) Draw and explain the working of master slave JK flip flop. Draw excitation table of JK flip flop. [8]

OR

Q8.

a) Design sequence detector to detect a sequence of 101011. Use JK flip flop in design. Draw the necessary state diagram, state table and logic diagram of you design. [10]

b) What is lock out condition? Design sequence generator using JK FFs. Avoid lockout condition. [8]



Q9.

a) What is ASM chart? State and explain the basic components of ASM Chart. Mention application of ASM chart. [8]

b) Write the VHDL code for full adder in structural and data flow modeling styles. [8]

OR

Q10.

a) Draw an ASM chart for the 3-bit down counter having one enable line such that:
E=1 (counting enabled)
E=0 (counting disabled)
Also draw the state diagram. [8]

b) Explain the following statements used in VHDL with suitable examples:
(1) Process (2) case (3) If then Else (4) Signal assignment [8]

Q11.

a) Explain the functions of following in microprocessor:
(1) ALU (2) Program counter (3) stack pointer (4) instruction register [8]

b) Implement the following functions using PLA: [8]
$F_1(A, B, C) = \sum m(1,2,4,6)$
$F_2(A, B, C) = \sum m(0,1,6,7)$

OR

Q12.

a) Explain in brief the functions of address bus, Data bus and control bus for a basic microprocessor, [8]

b) Draw and explain basic architecture of FPGA state difference between PLA and FPGA [8]

UNIVERSITY OF PUNE

[4362]-220

Electrical/Instrumentation/Computer/I.T.

S. E. Examination - 2013

Engineering Mathematics - III

(2008 Pattern)

Total No. of Questions : 12 **[Total No. of Printed Pages :6]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1) Answer Q1 or Q2, Q3 OR Q4, Q5 OR Q6, From section I and Q7 OR Q8, Q9 OR Q10, Q11 OR Q12 From section II.

*(2) Answers to the **two sections** should be written in **separate answer-books**.*

(3) Neat diagrams must be drawn wherever necessary.

(4) Black figures to the right indicate full marks.

(5) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.

(6) Assume suitable data, if necessary.

SECTION-I

Q1. (a) Solve (any three) [12]

1) $(D^2 - 1)y = cosx\ coshx$

2) $(D^2 + 2D + D)y = e^{-x} logx$

3) $\frac{d^2y}{dx^2} + \frac{1}{x}\frac{dy}{dx} = 2 + logx$

4) $\frac{dx}{xy^3 - 2x^4} = \frac{dy}{2y^4 - x^3y} = \frac{dz}{9z(x^3 - y^3)}$

Q.1 (b) An inductor of 0.25 henries is connected in series with a capacitor of 0.04 farads and a generator having alternative voltage given by 12sin10t. Find the charge and current at any time t. [5]

OR

Q2. (a) Solve: (any three) [12]

(1) $(D^2+1)y = xcos2x$

(2) $(D^2-2D+2)y = x^2+e^{-x}$

(3) $(D^2-2D)y = e^x sin^x$ (variation of parameters)

(4) $((2x+5)^2\frac{d^2y}{dx^2}+8y-4(2x+5)\frac{dy}{dx} = 5\log(2x+5)$

Q2. (b) Solve: [5]

$$\frac{dx}{dt}+\frac{dy}{dt}-3x-y = e^t; \frac{dx}{dt}+2x+y = 0$$

Q3. (a) If f(z) is analytic, prove that $(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2})\,|f(z)|^2 = 4\,|f^1(z)\,|^2$ [5]

(b) Show that the transformation w= z+$\frac{1}{z}-2i$ maps the circle |z|=2 an ellipse. [5]

(c) Evaluate: $\oint_c \frac{z+4}{z^2+2z+5}dz$ where c: |z+2i| = $\frac{3}{2}$ [6]

OR

Q4. (a) If f(z) = u+iv is analytic function, find f(z) if u+v=$3(x+y)+\frac{x-y}{x^2+y^2}$ [5]

(b) Find the bilinear transformation which maps the points 0,1,2 of z-plane to the points 1,$\frac{1}{2},\frac{1}{3}$ of w plane respectively.

(c) Evaluate:

$$\int_o^{2\pi}\frac{d\theta}{5-3cos\theta}$$ [6]

Q5. (a) Find fourier transform of

f(x)=$\begin{cases} cosx+sinx & |x|\le\pi \\ o & |x|>\pi \end{cases}$ [5]

(b) using fourier integral representation, show that :

$\frac{2}{\pi}\int_o^\infty \frac{(\lambda^2+2)cos\lambda x}{\lambda^4+4}\,d\lambda = e^{-x}cosx, x > 0$ [6]

(c) find z-transform of (any two) [6]

1) f(k)= $\frac{sinak}{k}, k \geq ,0$

2) f(k)= $k^2, k \geq 0$

3) f(k)= $\begin{cases} 7^k & k < 0 \\ 5^k & k \geq 0 \end{cases}$

OR

Q6. (a) Find inverse Z-transform of: (Any two) [8]

1) $\frac{2z^2-10z+13}{(z-3)^2(z-2)}$ $2 < |z| < 3$

2) $\frac{z(z+1)}{z^2-2z+1}$ |z| >1

3) $\frac{z^2}{z^2+4}$ inversion integral method

b) Solve:

f(k)-4f(k-2)=$\left(\frac{1}{2}\right)^k$, 4≥ 0 [4]

c) Solve integral equation:

$\int_0^\infty f(x)sin\lambda x dx = \frac{e^{-a\lambda}}{\lambda}, \lambda > 0$ [5]

SECTION II

Q.7 (a) Following are the marks of ten students in math's- III and strength of material (SOM) calculate the coefficient of correlation. [8]

M-III	23	28	42	17	26	35	29	37	16	46
SOM	25	22	38	21	27	39	24	32	18	44

(b) Calculate the first four central moments and β_1, β_2 for the following distribution. [9]

x	0	1	2	3	4	5	6	7	8
F	1	8	28	56	70	56	28	8	1

OR

Q8. (a) The mean and varience of Binomial distribution are 6 and 2 respectively

Find: 1) $p(r \leq 1)$ 2) $p(r \geq 2)$ [6]

(b) If the probability that an individual suffers a bad reaction from a certain injection is 0.001, then determine the probability that out of 2000 individuals

1) Exactly 3 will suffer a bad reaction

2) More than 2 will suffer a bad reaction [6]

(c) A manufacturer of envelops knows that the weight of envelope is normally distributed with mean 1.9 gm and varience 0.01gm. find how many envelopes weighing

1) 2 grams or more

2) 2.1 grams or more

Can be expected in a given packet of 1000 envelopes (Given Area for z=1 is 0.3413 and Area for z=2 is 0.4772) [5]

Q.9 (a) If $\overline{r}(t) = t^2\overline{i} + t\overline{j} - 2t^3\overline{k}$ then [5]

Evaluate $\int_1^2 \overline{r} \times \frac{d^2\overline{r}}{dt^2} dt$

(b) Prove the following (any two) [6]

1) $\overline{b} \times \nabla[\overline{a} \cdot \nabla logr] = \frac{\overline{b}\times\overline{a}}{r^2} - 2\frac{(\overline{a}.\overline{r})(\overline{b}\overline{r})}{r^4}$

2) $\nabla^2\left(\frac{\overline{a}\cdot\overline{b}}{r}\right) = 0$

3) $\nabla \times (\frac{\overline{a}\times\overline{r}}{r}) = \frac{\overline{a}}{r} + \frac{(\overline{a}\cdot\overline{r})\overline{r}}{r^3}$

Q9. (c) Find the directional derivative of $\phi = 4xz^3 - 3x^2y^2z$ at (2,-1,2) in direction towards the point (2,-2,4) [5]

OR

Q10. (a) Verify whether $\overline{F} = (ysinz - sinx)\overline{i} + (xsinz + 2yz)\overline{j} + (xycosz + y^2)\overline{k}$ is irrotational and if so find the scalar ϕ such that $\overline{F} = \nabla\phi$ [5]

(b) If $\overline{u}$ and $\overline{v}$ are irrotational vectors then prove that $\overline{u} \times \overline{v}$ is solenoidal vector. [5]

(c) If directional derivate of $\phi = ax^2y + by^2z + cz^2x$. at (1,1,1) has maximum magnitude 15 in the direction parallel to $\frac{x-1}{2} = \frac{y-3}{-2} = \frac{z}{1}$
Then find values of a,b,c. [6]

Q11. (a) Find the work done in moving the particle long the curve $x = acos\theta$, $y = asin\theta, z = b\theta$ from $\theta = \frac{\pi}{4}$ to $\theta = \frac{\pi}{2}$ under the field of force given by $\overline{F} = -3asin^2\theta\, cos\theta\overline{i} + a(2sin\theta - 3sin^3\theta)\overline{j} + bsin2\theta\overline{k}$ [5]

(b) Evaluate $\int\int_s (\nabla \times \overline{F}) \cdot \hat{n}\, ds$ where [6]

$\overline{F} = (x^3 - y^3)\overline{i} - xyz\,\overline{j} + y^3\overline{k}$ And S is the surface $x^2 + 4y^2 + z^2 - 2x = 4$ above the plane x=0.

(c) Evaluate $\int\int_s (x^3\overline{i} + y^3\overline{j} + z^3\overline{k}) \cdot\ d\overline{s}$ where S is the surface of the sphere $x^2 + y^2 + z^2 = 16$ [6]

Q.12 (a) Evaluate $\int\int_s \frac{\overline{r}}{r^3} \cdot \hat{n}\, ds$ by using Gauss Divergence theorem [5]

(b) Use Stoke's theorem to evaluate [6]

$\int_c (4y\bar{i} + 2z\bar{j} + 6y\bar{k}) \cdot d\overline{r}$ where 'c' is the curve of intersection of $x^2 + y^2 + z^2 = 2z$ and $x = z - 1$

(c) Two of the maxwell's equation are $\nabla \cdot \overline{B} = 0$, $\nabla \text{X}\, \overline{E} = -\frac{\partial \overline{B}}{\partial t}$. given $\overline{B}$ = curl $\overline{A}$ then deduce that $\overline{E} + \frac{\partial \overline{A}}{\partial t} = -$grad (v) where V is a scalar point function.

UNIVERSITY of PUNE
[4362]-216
S. E. Computer Engineering
Examination - 2013
Microprocessor &
Interfacing Techniques
(2008 Course)

[Total No. of Questions: 12] **[Total No. of Printed Pages: 3]**
[Time: 3 Hours] **[Max. Marks: 100]**

Instructions:

*(1) Answer **three** questions from each section-I and **three** questions from section-II.*
*(2) Answers to the **two sections** should be written in **separate answer-books**.*
(3) Black figures to the right indicate full marks.
(4) Neat diagrams must be drawn wherever necessary.
(6) Assume suitable data, if necessary.

SECTION-I

Q. 1. A) Draw and explain internal architecture of 8086 microprocessor. (8)

B) Explain even and odd memory bank along with BHE and A0 signals. (6)

C) Explain how 20-bit physical address is obtained in 8086. (4)

OR

Q. 2. A) Draw and explain the memory write timing cycle of 8086 microprocessor in maximum mode. (8)

B) Compare Memory mapped I/O and I/O mapped I/O. (6)

C) Explain the function of ALE, NMI, TEST and MN/MX pins of 8086. (4)

Q. 3. A) Explain the different addressing modes of 8086 along with suitable Example. (8)

B) Write an 8086 assembly language program to multiply two 8-bit (8)

numbers using add and shift method.

OR

Q. 4. A) Explain the following instruction for 8086 microprocessor. (6)

i) IMUL ii) PUSHF iii) SAR iv) INTO

B) Explain the following assembler directives. (4)

i) EQU ii) ASSUME iii) END iv) PUBLIC

C) Write an 8086 ALP to generate a delay of 100ms. If 8086 system running at 10MHz. (6)

Q. 5. A) Compare COM files and EXE files. Explain the procedure to generate and EXE files from ASM files. (8)

B) Draw and explain internal block diagram of 8259. (8)

OR

Q. 6. A) What is IVT of 8086? Explain its structure in details. (8)

B) Draw and explain 8259 initialization command word format. (8)

SECTION-II

Q. 7. A) Explain Mode 0 and BSR mode of 8255 with appropriate control word formats. (8)

B) Interface a typical 8-bit DAC with 8255 and write a program to generate staircase waveform. (10)

OR

Q. 8. A) Write instructions sequence to program 8251 for asynchronous transmission with 8 data bits, 2 stop bit and no parity with 9600 baud rate. (8)

B) What is handshaking? Draw interfacing diagram of centronix parallel printer interface to 8255. Explain with timing diagram. (10)

Q. 9. A) Explain different I/O modes available in 8279. (8)

B) Explain operation of 8254 in modes 0 and 3 with help of timing diagram. (8)

OR

Q. 10. A) Draw and explain the complete interface diagram between 8086 and 8279 with 4x4 keyboard matrix. (8)

B) What is DMA? Explain the various modes of 8237 in details. (8)

Q. 11. A) Draw and explain minimum mode configuration of 8086 processor. (8)

B) Draw and explain internal architecture of 8087 NDP.

OR

Q. 12.A) Explain status word and control word of 8087 NDP. (8)

B) Draw and explain internal block diagram of 8288 in details (8)

[Total No. of Questions: *12*] **[Total No. of Printed Pages: 3]**

UNIVERSITY OF PUNE

[4362]-217

S. E. (*Computer***) Examination - 2013**

Data Structures (2008 Course)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions:

1 *Answer three questions from section-I and three questions from sections-II.*

2 *Answers to the* ***two sections*** *should be written in* ***separate answer-books****.*

3 *Neat diagrams must be drawn wherever necessary.*

4 *Figures to the right indicate full marks.*

5 *Assume suitable data, if necessary.*

SECTION -I

Q.1 A The inorder and postorder traversals of a certain binary search tree are given as follows. 6

Inorder Traversal: 10,30,40,50,52,54,55,60,90

Postorder Traversal: 40,54,52,55,50,30,60,90,10

Construct the binary search tree from above traversals and write the preorder traversal.

B Write a non-recursive pseudo C/C++ code to display the height of a binary tree 6

C Define the following terms and their use with respect to the threaded binary tree with suitable example. 6

i. Inorder threaded binary tree

ii. Inorder successor

iii. Inorder predecessor

OR

Q.2 A List the different depth first search traversal techniques for binary trees. Write a pseudo C algorithm for any one of the above techniques. 6

B Write a non-recursive pseudo C/C++ code to generate the 6

mirror image of a binary tree.

C For the binary tree represented as an array of size 30, perform in-order threading on the tree: 6

A B C D E F G H — — F — — — J K — — — — — — — — — — — L — — —

Q. 3 A Explain with example inverse adjacency list representation of graph. 4

B Write a pseudo C/C++ code to display breadth first traversal of a graph. Explain the working with suitable example. 8

C What is the difference between the Prim's and Kruskals's algorithms for minimum spanning trees? 4

OR

Q. 4 A For the following graph represented in the from of adjacency matrix representation, generate the minimum tree using Kruskal's algorithm 8

	A	B	C	D	E	F	G	H
A	0	1	1	0	0	0	0	0
B	1	0	0	0	1	0	0	0
C	1	0	0	1	0	1	0	0
D	0	0	1	0	0	0	0	1
E	0	1	0	0	0	0	1	0
F	0	0	1	0	0	0	1	1
G	0	0	0	1	0	1	0	0
H	0	0	0	1	0	1	0	0

B Write a pseudo C/C++ code to find a shortest path of a given graph using Dijkstra's shortest path algorithm. 8

Q. 5 A Construct AVL search tree by inserting the following elements in the order of their occurrence. Show the balance factor and type of rotation at each step. 8
70,55,60,65,50,80,49,68,44,66,77,79

B What is the use of hash tables? Explain the characteristics of a good hash function. 4

C Enlist various static and dynamic tree tables. Explain when to select the static tree tables and dynamic tree tables. 4

OR

Q. 6 A Write a pseudo C/C++ code for LL,RR,LR and RL 8

		rotations for AVL tree	
	B	Assume a hash table of size 10 and hash function H(X)=X mod 10 performs linear probing with and without replacement for the given set of values. 0,1,2,4,72,65,85,87,90,58.	8

SECTION II

Q. 7	A	Define the term heap trees. Write a pseudo C/C++ code to insert the element in Max Heap.	8
	B	Create a B+ tree of order 3 for the data given below. 55,10,40,20,12,15,90,80,45,52,25,22,85,95,65	10
		OR	
Q. 8	A	Sort the following numbers in descend using heap sort 22,75,34,55,25,10,45,52,90,65	10
	B	Write a pseudo C/C++ code to delete the node in B tree	8
Q. 9	A	What is file organization? Explain any three types of file organization.	8
	B	Write a C/C++ program to create a sequential file and to implement primitive operations for the same.	8
		OR	
Q. 10	A	Compare sequential file organization, indexed file organization and direct file organization	8
	B	Explain different modes of opening file	4
	C	Compare text and binary files	4
Q. 11	A	Write a C++ program using STL stack to convert decimal number to binary number	6
	B	What is STL? Explain various components of STL	10
		OR	
Q. 12	A	Implement doubly ended queue as ADT using STL	8
	B	Explain the following terms i. ADT ii. Generic programming iii. Iterators iv. Containers	8

[Total No. of Questions: 12] **[Total No. of Printed Pages: 8]**

UNIVERSITY OF PUNE
[4362]-211
S. E. (Computer & I.T.) Examination - 2013
DISCRETE STRUCTURE (2008 Course)

[Time: 3 Hours] **[Max. Marks: 100]**

SECTION -I

Q.1 A Convert the following English statement in the symbolic from 6

i) If I am not studying maths and I go to a movie then I am in a good mood.

ii) If I am in good mood, then I will studying maths or I will go to a movie.

iii) If I am not in good mood, then I will not go to a movie or I will study maths.

iv) I will go to a movie or I will not study maths if and only if I am in a good mood

B In a town there are 2000 literate person ,of them 60 % news paper A. 55% read newspaper B and 20% read neither A nor B. How many individuals read. 6

(i) Both the newspaper A and B?

(ii) Only one newspaper?

C Determine whether the following arguments are valid or invalid. 6

(i) If Aaryan study hard, He will obtain first class. He will get a good job. Therefore if Aaryan study hard, he will get a good job.

(ii) If Geeta goes to class. She is on time. But Geeta is late. She will therefore miss the class.

(iii) I am happy if my program runs. A necessary condition for the program to run is it should be error free. I am not happy. Therefore is not error free.

OR

Q.2 A Prove by mathematical induction. 6

$2 + 5+8+.....+(3n-1)=n(3n+1)/2$

B Prove the following by using Venn Diagram. 6

i) $A \oplus B \oplus C=(A \oplus B \oplus C)$

ii) $(A \cap B \cap C)=A-[(A-B) \cup (A-C)]$

iii) $A \cap B \oplus C =(A \cap B) \oplus (A \cap C)$

C What is multiset? For a given multiset find the following operations 6

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

B={a,b,d,f,g}

C={b,c,e,e,g,h,h}
D={a,d,d,e,f,f,g,h}
Find. (i)A U B (ii)C ∩ B (iii)A-D (iv)B+C

Q. 3 A Define the following terms with suitable example. 8

(i)Group
(ii)Subgroup
(iii)Ring
(iv)Integral Domain

B Let G={Even, Odd} and binary operation ⊕ is defined as . 4

⊕	Even	Odd
Even	Even	Odd
Odd	Odd	Even

Show that (G,⊕)is an abelian group.

C Let (A,*) be a monoid such that for every x in A.x* x=e. where e is identity element. Show that (A,*) is an abelian group. 4

OR

Q. 4 A Define the following terms with suitable example. 8

(i)Field
(ii)Monoid
(iii)Homomorphism
(iv)Automorphism

B Consider (3,4)parity check code. For each of the following received words. 4

Find whether an error will be detected?

i) 0010
ii) 1001
iii) 1101
iv) 1010
v) 1111
vi) 0011

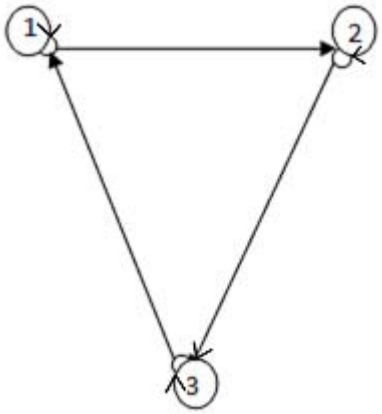
C What is hamming distance??Find the minimum distance of the following(2,5)encoding function e. 4

e(00)=00000
e(10)=00111
e(01)=01110
e(11)=11111

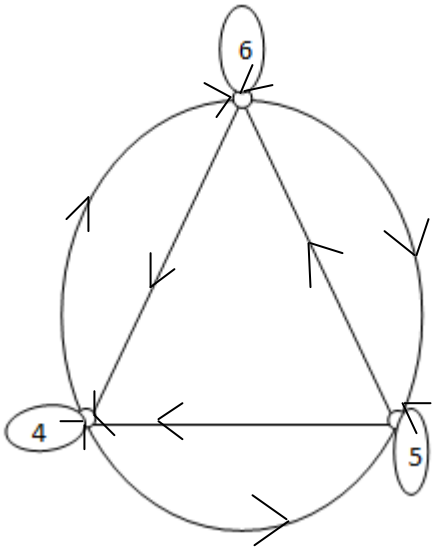
Q. 5 A Determine whether the relation R whose diagraph is given below 6

is an equivalence relation.

I)



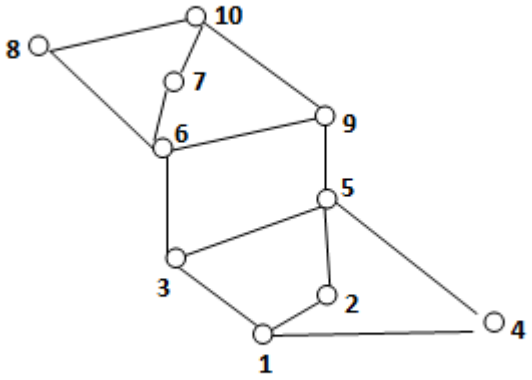
ii)



B Let A={1,2,3,4} and R={(1,2),(2,4),(1,3),(3,2)} 5
Find the transitive closure of R by warshall's algorithm.

C For A={1,2,3.....10}.Consider the POSET (A,R)whose hasse the diagram below. Find 5

i) glb{2,3}
ii) glb{2,7}
iii) glb{5,8}
iv) lub{3,2}
v) lub{4,8}
vi) lub{3,5}



OR

Q. 6 A Solve the recurrence relation. 6

(i)$a_n = 2a_{n-1} - a_{n-2}$ with initial conditions a1=1.5 and a2=3

(ii) $a_n = -3a_{n-1} - 2a_{n-2}$ with initial conditions a1=-2 and a2=4.

B Identify the types of function for the following statement with justification 4

i) To each person on the earth assign the number which correspond to his age.
ii) To each country assign the number of people living in the country.
iii) To each book written by only one author, assign the author.
iv) To each country having prime minister assign the prime minister.

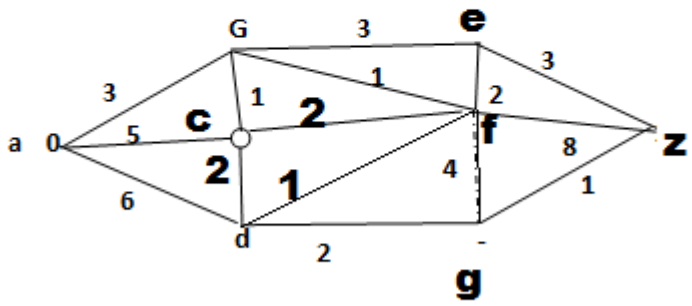
C (c)Let A={1,2,3,4,5} and π={{1,2},{3},{4,5}}.Find the equivalence relation determined by π and draw the diagraph. 6

SECTION II

Q. 7 A Define the following with an example with respect to graph theory. 8

i) Multi graph
ii) Isomorphic graph
iii) Bipartite graph
iv) Self complementary graph
v) Planar graph

B Use Dijkstra algorithm to find the shortest path from a to z. 8



OR

Q. 8 A State necessary and sufficient condition for the existence of Hamilton path and Circuit in K_{MN} & K_N . 6

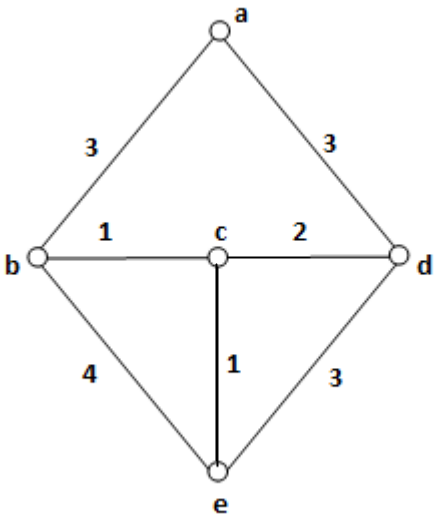
B Show that a complete graph with n vertices consist of n(n-1)/2 edges. 5

C Show that if G is connected planar graph with N vertices, E edges and R regions the N-E+R=2 5

Q. 9 A Define the following terms with reference to the tree. 6

i) Binary search tree
ii) M-ary tree
iii) Tree traversal

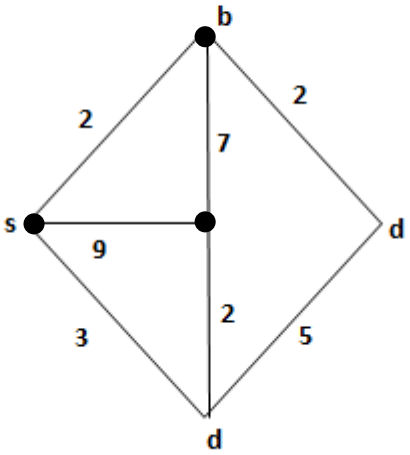
B Use Prim's algorithm to find the minimum spanning tree of the give graph G (below). 5



C Draw a binary tree for input data 200,100,300,50,150,250,400,10,75,125,175.Identify the root, leaf & interior nodes. 5

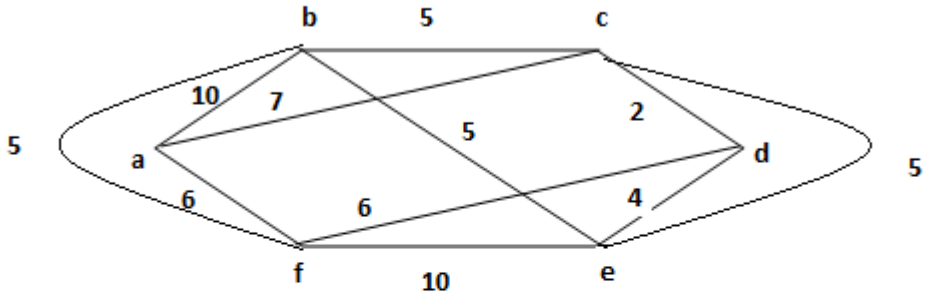
OR

Q. 10 A Determine the maximum flow in the following transport network by using labeling procedure. 6



B Use Huffman coding to encode the following symbol with the frequencies listed. A:0.08,B:0.010,C:0.12,D:0.15,E:0.20,F:0.35.List the prefix code. 5

C Find the minimum spanning tree by using Kruskal's algorithm. 5



Q. 11 A If repetition is not allowed how many 4 digits number can be formed with the digits 1,2,3,4,5,7,8? 6

i) How many are less than 5000?
ii) How many even digits can be formed?
iii) How many odd digits can be formed?

B In how many ways 9 people can be seated at a round table if 6

i) They can sit anywhere?
ii) 2 particular person must not sit next to each other?

C Five boys and five girls are to be seated in a row. In how many ways they can be seated if 6

i) All boys must be seated in the five left most seats.
ii) No two girls can be seated together
iii) Mona and Kiran must be seated together.

OR

Q. 12 A Two dice are rolled together .Event A denotes that sum of numbers on top faces is even and event B denotes that there is a 4 on at least one of the top faces. Find 6

(i)P(A U B)
(ii)P(A ∩ B)

B A bag A contains 2 white and 4 black balls. Another bag B contains 5 white and 7 black ball .A ball is transferred from bag A to bag B ,then a ball is drawn from bag B. Find the probability that it is white. 6

C In a university 60 % professors are male and 40 % are females. Also 50 % of male professors are and 60% of female professors know computer programming. Find the probability that a professor knowing computer programming is a female. 6

UNIVERSITY OF PUNE

[4362]-212

S. E. (Computer Engineering)

Examination - 2013

PROGRAMMING AND PROBLEM SOLVING

(2008 Pattern)

[Total No. of Questions:12] **[Total No. of Printed Pages:3]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1) Answer ***any 3 section from each section***

(2) Answers to the ***two sections*** *should be written in* ***separate answer-books****.*

(3) Black figures to the right indicate full marks.

(4) Neat diagrams must be drawn wherever necessary.

(5) Assume suitable data, if necessary.

(6) Black figures to the right indicate full marks.

SECTION-I

Q1 a) You have a new admission to college. There are different transportation options that you can use to get your new college (Bus, walking, train, etc.), but which should you use? Use the six problem-solving steps to show how you could develop an algorithmic solution to this problem. [8]

b) Evaluate for A=TRUE, B=TRUE, C=FALSE, D=FALSE [8]

i) R = (A OR B) AND C

ii) R= A AND B OR C

iii) R = B AND C OR A

iv) R = NOT C AND NOT D OR A

OR

Q2 a) Write a short note on Top down design

b) What is function? Explain different types of function with examples. [6]

c) Write a Logical expression for the following conditions. A company gives a bonus at the end of each financial year. For an employee to get a bonus, the following must be true: [4]

i) The employee has been working at company for more than six months with no negative reports.
ii) The employee has earned more than 50,000 during the financial year.

Q3 a) Briefly discuss the differences between cohesion and coupling. Discuss how three different approaches to coupling modules can be used. [6]

b) Define the terms call-by-reference and call-by-value. Using appropriate examples discuss when it is appropriate to use each of these in a program. [6]

c) What do you mean by Data Dictionary? Explain with suitable example. [6]

OR

Q4 a) Mobile postpaid connection charges as follows: [12]

First 200 calls : Free
Extra usage Local : Rs. 1/min
STD : Rs. 1.5/min

All customers are charged monthly rental of Rs 300 and service tax of 12.5% on total bill amount. Describe and explain complete steps of solution development to read name of customer, tariff of Local & STD calls and print out the total amount to be charged.

b) Describe Positive logic with suitable example. [6]

Q5 a) Design and explain an algorithm that will find its smallest exact divisor other than one. [8]

b) Design an algorithm that will reverse the digits of a given number. For e.g algorithm should convert the number 123 to the number 321. [8]

OR

Q6 a) Design and explain an algorithm for GCD of two numbers. [8]

b) Design an algorithm for exchanging values of two variables. Also explain any one application with example in which we use this algorithm. [8]

SECTION-II

Q7 a) Write a pseudo algorithm for removal of duplicates from an ordered array. [8]

b) Write short note on : [8]

i) Pointer technique

ii) Table Look-Up technique

OR

Q8 a) Design and implement to find the maximum number in a set and position

i) where it first occurs

ii) where it last occurs. [8]

b) Write a pseudo algorithm for partition a randomly ordered array of n elements into two subsets such that element less than equal to X are in one subset and elements are greater than X are in other subset. [8]

Q9 a) Design and implement an algorithm that will search a given text for a particular pattern and count number of times the pattern is found. [8]

b) Write and explain algorithm for text length adjustment. [8]

OR

Q10 a) Explain algorithm for line Editing. [8]

b) Explain algorithm for left-right justification of a given text. [8]

Q11 a) Write a C++ program for a Books Library that need to track students, issue books and its deposit and late fees: [8]

i) design classes you would create the application.

ii) Write Suitable methods.

iii) Print Students and its details about deposit and late fees.

b) Explain Access specifier. [6]

c) Explain object and classes with example. [4]

OR

Q12 a) Explain the following with example. [18]

i) Polymorphism

ii) Multiple Inheritance.

iii) Encapsulation and Data Abstraction.

UNIVERSITY OF PUNE

[4362]-214

S. E. (Computer) (First Semester) Examination 2013

DATA STRUCTURES AND ALGORITHM

(2008 Pattern)

[Total No. of Questions:12] **[Total No. of Printed pages :3]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

*(1) Answer **any three** questions from each section.*

(2) Answers to the two Sections should be written in separate answer-books

(3) Figures to right indicate full marks.

(4) Assume suitable data, if necessary.

SECTION I

Q1a) Write a C function to compare two strings using pointer & without using library function. [5]

b) Explain with example fread, fwrite, ftell & fseek functions for file handling in [8]

c) Explain call by reference to function using example. [3]

OR

Q2.a) Explain different modes to open file in C. [6]

b) Write a recursive function for following [5]

f(n)=n if n =0,1

=f(n)*f(n/2) otherwise

c) Write 'C' function to display , total number of line, spaces, vowels and alphabets of given text file. [5]

Q3. a) What is the frequency count of the following: [5]

```
int fact (int n)
{
if (n ==1)
{
        Return (1);
}
```

Else

Return (n * fact (n-1));

}

Find out time complexity.

b) Write 'C' functions to display magic square matrix. What is its time complexity? [5]

c) Explain different Asymptotic notations with example. [6]

OR

Q4. a) What is Abstract Data Type? Write an ADT for rational number. [8]

b) Write an algorithm for matrix multiplication for n × n matrix and find out its time complexity by frequency count. [8]

Q5.a) Explain how two dimensional array A[1 : m, 1 : n] is represented in computer memory using Row Major & Column Major representation and obtain a formula using both methods for computing the address of any element A[i, j], where 1 <=i <=m and 1<=j <=n. [10]

b) Write a 'C' function to implement polynomial multiplication using array. Explain time complexity for above function. [8]

OR

Q6.a) What is sparse matrix? Write an ADT for sparse matrix. Write an algorithm to find simple transpose of sparse matrix and find out its time complexity. [12]

b) Write an ADT for multidimensional Array. [6]

SECTION II

Q7 a) Sort the following numbers step by step by using Shell sort: Also comment on time complexity of Shell sort. 20, 15, 21, 06, 08, 05, 29, 02, 14, 40. [10]

b) Write a pseudocode to search element using Fibonacci search. [6]

OR

Q8 a) Write and explain worst case input for quick sort to sort list of numbers in ascending order. State worst case time complexity. [6]

b) Write an algorithm for Binary Search. Explain its best case, worst case & average case complexity with example. [10]

Q9.a) Write pseudocode to marge two sorted lists of integers stored in singly linked list to form a third sorted list, Analyze time complexity of this code. [10]

b) Show graphical representation for the following GLL: [6]
(a,b, (c,d,(e,f), g, (h, ()), ((j,k)),I),m)

OR

Q10.a) Write & explain a node structure to represent polynomial using GLL. What are the advantages of using GLL for polynomial representation? [8]

b) Write a function to perform addition of two polynomial using Circular linked list. Explain time complexity of it. [8]

Q11.a) Write short note on [18]

1) Josephus problem
2) Multi-stack implementation
3) Priority Queue

OR

Q12a) Write an algorithm to convert prefix expression to infix expression. Comment on its time complexity [8]

b) Convert following infix expression to postfix expression.& evaluate expression with following values [10]

University of Pune
S.E. (Computer Engineering/Information Technology)
4362-215
Examination - 2013
Humanities and Social Sciences.
(2008 Pattern)

[Total No. of Questions : 6] **[Total No. of Printed Pages :3]**
[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1) Answers to the ***two sections*** *should be written in* ***separate answer-books****.*
(2) Figures to the right indicate full marks.
(3) Neat diagrams must be drawn whenever necessary.
(4) Answer any three questions from each section

Section I

Q1.

a) Family system is core requirement for social development. Discuss. [8]
b) India is a Multicultural Society. Explain in brief. [8]

OR

a) Explain the role of Panchayat Raj System in India. [8]
b) Explain the Secular Policy of India. [8]

Q2.

a) Education is important for Economic development. Explain with reference to Indian Education Policy. [8]
b) Trace out the impacts of Industrial Revolution. [8]

OR

a) Comment on Evolution of Human Society in brief. [8]
b) Describe the role of Government in Health Care Sector in India. [8]

Q3.

a) Industrial Development of India is quite remarkable. Explain in brief. [9]
b) Agriculture is the backbone of Indian Economy. Discuss. [9]

OR

a) India is a land of greater opportunities for investments in Infrastructure sector. Explain. [9]
b) Discuss the role of Technology in generation of the employment for masses. [9]

Section II

Q4.

a) Discuss the various energy sources in India. [8]
b) Impact of population growth faced by India for overall Economic development is a serious problem. Comment. [8]

OR

a) Explain the importance of preservation of Ecological systems. [8]
b) What are the different types of pollutions? What are the different ways and means of controlling them? [8]

Q5.

a) Explain the objectives of Five Year Plans. [8]
b) Explain the basic feature and problems Indian Economy. [8]

OR

a) Explain the development prospects of Indian Economy in globalised world. [8]
b) Explain Law of Demand with exceptions. [8]

Q6. A) Write short notes on: [18]

1. WTO
2. Functions of RBI
3. Cost Analysis

OR

A) Explain the following Ratios. [9]

1. Profitability Ratios
2. Capital Turnover Ratio
3. Inventory Turnover Ratio

B) Discuss the functions of Financial Institutions in India. [9]

[Total No. of Questions: 12] **[Total No. of Printed Pages: 3]**

UNIVERSITY OF PUNE
[4362]-218
S. E. (Computer)(Second semester) Examination - 2013
COMPUTER GRAPHICS (2008 Course)
[Time: 3 Hours] **[Max. Marks: 100]**

Instructions:

1 *Answers to the two sections should be written in separate answer-books.*
2 *Attempt q. No. 1 or q. no2, Q. No. 2, Q. No. 3 or Q. No. 4, Q. No. 5 or Q. No. 6 from Section I and Q No. 7 or Q. No. 8, Q. No. 9 or Q. No. 10. Q. No. 11 or Q No. 12 from section II.*
3 *Black figures to the right indicate full marks.*
4 *Neat diagrams must be drawn wherever necessary.*
5 *Assume suitable data, if necessary.*
6 *Answer any three questions from Section I and any three questions from Section II*

SECTION -I

Q.1 A) Explain Bresenham's circle drawing algorithm in detail. Also explain error factor with derivations [12]

B) Explain the various character generation methods [6]

OR

Q.2 A) Consider the line from (0,0) to (6,6) Bresenham's algorithm to rasterize this line. [6]

B) Explain following terms with suitable example: [6]

i) Pixels
ii) Resolution
iii) Frame buffer.

C) What is antialiasing? Explain any two antialiasing [6]

techniques.

Q. 3	A)	Enlist any three polygon filling algorithms. Explain even-odd method of inside test.	[8]
	B)	What is window and clipping? What is interior and exterior clipping?	[8]
		OR	
Q. 4	A)	Explain Cohen-Sutherland outcode algorithm with example.	[8]
	B)	Enlist any three methods of polygon filling Explain how polygon is filled with pattern.	[8]
Q. 5	A)	Write a note on Parallel and Perspective projection and state their types.	[8]
	B)	Describe 3D viewing transformations	[8]
		OR	
Q. 6	A)	Magnify the triangle with vertices A(0,0) B(1,1) C(5,2) to twice its size as well as rotate it by 45^{o}. Derive the translation matrices.	[8]
	B)	Derive the transformation matrix for rotation about an arbitrary point.	[8]

SECTION II

Q. 7	A)	What is a segment table? Explain the operations that can be performed on a segment table?	[8]
	B)	What are the various methods of controlling animation? Explain in detail.	[8]
		OR	
Q. 8	A)	Explain the data structures that can be used to	[8]

implement the segment table.

B) Explain morphing? What is simulating acceleration? [8]

Q. 9 A) Explain the following in detail [18]

i) Diffuse Illumination

ii) Specular Reflection

iii) Gouraud method of shading

iv) CIE Chromaticity Diagram

v) Color Models

vi) Ray tracing

OR

Q. 10 A) Explain various surface shading algorithms [8]

B) Explain the following with the help of an example [10]

(i) BSP tree

(ii) Backface removal algorithm

Q.11 A) What are fractals? Explain how fractal line algorithm can be used for generating fractal surface. [8]

B) Explain any two hidden surface removal algorithms. [8]

OR

Q. 12 A) Write short notes on [16]

i) B Splines

ii) Bezier Curves

iii) Fractals

iv) 3D Studio/Maya

[Total No. of Questions: 12] **[Total No. of Printed Pages: 3]**

UNIVERSITY OF PUNE

[4362]-219

S. E. (Comp. Engg.) (Sem II) Examination - 2013

Computer Organization (2008 Course)

[Time: *3* Hours] **[Max. Marks: 100]**

Instructions:

1 *Answer any three questions from each section*

2 *Answers to the* ***two sections*** *should be written in* ***separate answer-books****.*

3 *Black figures to the right indicate full marks.*

4 *Neat diagrams must be drawn wherever necessary.*

SECTION -I

Q.1	A	Explain instruction cycle with the help of state diagram.	08
	B	Draw and explain the flowchart for floating point subtraction.	08
		OR	
Q.2	A	Explain the IEEE standards for signal precision and double precision floating point format. Represent the following using single precision format $(0.625)_{10}$	10
	B	Explain with the help of flowchart non restoring division algorithm.	06
Q. 3	A	Explain the design of ALU.	08
	B	Describe the following addressing modes along with suitable examples:	08

a. Direct

b. Indirect
c. Immediate
d. Auto increment.

OR

Q. 4	A	Explain the following: a. Instruction cycle b. Instruction pipelining	08
	B	Explain register organization of 8086.	08
Q. 5	A	Compare hardwired control Vs micro programmed control unit.	06
	B	Explain in detail state table design method for hardwired control.	08
	C	Explain brief : Emulation	04

OR

Q. 6	A	Draw the single bus organization of the CPU and write the control sequence for the unconditional branch instruction.	12
	B	Explain in detail micro instruction sequencing organization.	06

SECTION II

Q. 7	A	Explain: i. Direct ii. Set associative cache mapping techniques along with its merit and demerits.	12
	B	What are the different replacement algorithms? Explain LRU algorithm in detail.	06

OR

Q. 8	A	What is MESI protocol? Explain the meaning of each of the four states in the MESI protocol.	08
	B	Explain briefly: i. RAID ii. Virtual memory	10

Q. 9	A	Explain synchronous and asynchronous bus for read operation with timing diagram.	10
	B	Compare programmed I/O & Interrupt driven I/O	06
		OR	
Q. 10	A	Explain PCI bus with a diagram.	06
	B	Write short note on (any three): i. Keyboard ii. Mouse iii. Dot matrix Printer iv. Laser Printer v. USB Port	10
Q. 11	A	Write short note on: (any four) i. Cluster ii. NUMA iii. UMA iv. Superscalar Architecture v. SMP vi. Vector computation	16
		OR	
Q. 12	A	Explain closely coupled system with the help of diagram.	08
	B	What are the methods of bus arbitration? Explain polling method of bus arbitration with a diagram.	08

UNIVERSITY OF PUNE
[4362]-220A
S. E.(Computer)Examination May - 2013
FINANCIAL AND INDUSTRIAL MANAGEMENT
(2003 Pattern)

[Total No. of Questions:12] **[Total No. of Printed Pages :3]**
[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

*(1) Answer **any three** from each section.*
*(2) Answers to the **two sections** should be written in **separate answer-books**.*
(3) Black figures to the right indicate full marks.
(4) Neat diagrams must be drawn wherever necessary.

SECTION-I

Q1 a) Critically explain F.W Taylor's theory of scientific management. [8]

b) Define Management. Explain various functions of management. [8]

OR

Q2 a) State and explain various principles stated in Henry Fayol's theory of Management. [8]

b) "Management is an art, science as well as a Profession". Explain. [8]

Q3 a) What is human wants? Explain various characteristics of human wants. [8]

b) Explain law of demand with its determinants. How is the demand curve derived? [10]

OR

Q4 Explain the following concepts: [18]

i) Role of SEBI ii) Patent and Copy Right iii) Contract Act.

Q5 a) Explain the concept of ERP and E-commerce. [8]

b) State how Functional Organization is an improvement over Line and Staff Organization. [8]

OR

Q6 Explain various forms of business organization. Differentiate between Partnership and Joint Stock Company. [16]

Q7 What is man power planning? Explain the objectives and functions of Manpower planning. Define communication process. Explain the barriers to communication and its impact to business. [8]

OR

Q8 a) State and explain different methods of training and its significance to Industry [8]

b) Define Capital Structure. Explain various types of capital and their importance. [8]

Q9 Explain in brief. [16]

a) Capital Budgeting ii) Money Market & Capital Market

OR

Q10 Define Break-even Analysis. Construct CVP graph and explain its assumptions and importance. [16]

Q11 a) State and explain the concept of credit rating. Explain the process of credit rating for Software Industry. [10]

b) What is overheads? Explain various types of overheads. [8]

OR

Q12 a) What is depreciation? Explain various methods of depreciation. [12]

b) Explain the significance of the following Ratios: [6]

i) Debt-equity ratio ii) Acid-test ratio

UNIVERSITY OF PUNE

[4362]-220B

S. E. (COMPUTER) Examination 2013

ELECTRONIC DEVICES AND CIRCUITS-210242

(2003 Course)

[Total No. of Questions:] 12 **[Total No. of Printed pages :2]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1) *Answer question Q.1, or Q.2, Q.3 or Q.4,Q.5or Q.6,from SECTION- I and Q.7 or Q.8, Q.9 or Q.10,Q.11or Q.12 from SECTION-II*

(2) *Answers to the two Sections should be written in separate answer-books*

(3) *Neat diagram must be drawn wherever necessary.*

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

SECTION I

Q.1 a) Define Biasing and explain the concept of quiescent point (Q). [8]

b) Draw a neat circuit diagram of voltage divider bias single stage amplifier and state the function of each component. [8]

OR

Q.2 a) Define the JFET parameters and establish the relationship between Them. [8]

b) Define and explain the term Thermal runaway. [8]

Q.3 a) State and Explain Millers Theorem. [8]

b) Explain with neat diagram the emitter follower circuit. [8]

OR

Q.4 a) Draw and explain the circuit for High Input Impedance. [8]

b) Compare CE, CB and CC Configuration of BJT. [8]

Q.5 a) Explain the effect of Multistage amplifier on the gain and Bandwidth. [10]

b) Explain crossover distortion in large signal amplifier. [8]

OR

Q.6 a) Compare large signal amplifier and small signal amplifier in BJT. [8]

b) What do you understand by Class A, Class B, and Class C power amplifier? Compare them with the Q point on the dc load line. [10]

SECTION II

Q.7 a) Compare Common drain. Common gate and Common source configuration in JFET. [8]

b) With the help of neat diagram explain construction, drain and transfer characteristics of n-channel JFET. [8]

OR

Q.8 a) List the Ideal and Typical characteristics of OP-AMP (IC 741) [8]

b) Draw and explain a Schmitt trigger circuit over a comparator circuit. [8]

Q.9 a) Define op-amp and explain the Block diagram of op amp. [8]

b) Draw the Inverting amplifier using op amp and derive the expression for its Voltage gain. [8]

OR

Q.10 a) Draw and explain with neat diagram a Triangular wave generator using op-amp. [8]

b) Draw and explain an Instrumentation amplifier circuit using three op-amp. [8]

Q.11 a) Draw a block diagram of SMPS. State its various applications. [8]

b) Explain the construction. Operation and V-1 characteristics of Diac. [10]

OR

Q.12 a) Compare and explain ON line and OFF line UPS. [10]

b) Compare SCR and TRIAC. [8]

****