4/6/13 SE Sem III (Rev) Computer COA

V-A4-1st-Hf-Ex-13-E-92

Con. 6595-13. **GS-6621**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** out of remaining **six** questions.
(3) Assume **suitable** data wherever **necessary.**
(4) Answer to **each** new question to be started on **fresh** page.

1. (a) Explain different Instruction formats with suitable example. **10**
   (b) Define following terms :— **10**
   (i) Computer organization.
   (ii) Computer Architecture.
   (iii) MDR.
   (iv) PC.
   (v) SP.

2. (a) Explain Instruction cycle with interrupt execution in detail. **10**
   (b) Compare and explain static and dynamic data flow computers. **10**

3. (a) Explain IEEE-754 formats. **10**
   (b) Explain cache memory mapping techniques with example. **10**

4. (a) Explain Micro-programmed control unit in detail. **10**
   (b) Explain 6-stage Instruction execution with pipelined processor. **10**

5. (a) Explain types of memories based on the hierarchy of speed and size. **10**
   (b) Define "(Input/Output) I/O Module". State the difference between Programmable and Non-programmable devices with suitable examples. **10**

6. (a) Compare RISC and CISC processors. **10**
   (b) Explain Interleaved Memory with low-order and high-order Iinterleaving. **10**

7. Write short notes on any **four** of the following :— **20**
   (a) RAID Memory.
   (b) Booth's Algorithm.
   (c) MIMD and SIMD.
   (d) Paging and Segmentation.
   (e) Page Replacement Algorithm.

———v———

SE | COMP | III (R.)
EDLC 13|5|13

P4-RT-Exam.-Feb.-13-2-275

Con. 6402-13. **GS-6195**

(3 Hours) **[Total Marks : 100**

N.B. : (!) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of the remaining **six** questions.
(3) **Figures** to the **right** indicates **full** marks.
(4) Assume **suitable** data wherever **necessary** and mention it clearly.

1. (a) Explain the purpose of thin and lightly doped base region of BJT structure. **5**

(b) List the characteristic features of 555 timer. **5**

(c) Design a circuit with OP-AMP to produce the O/P V_0 given by – **5**

$$V_0 = (Vs_1 + Vs_3) - (Vs_2 + Vs_4)$$

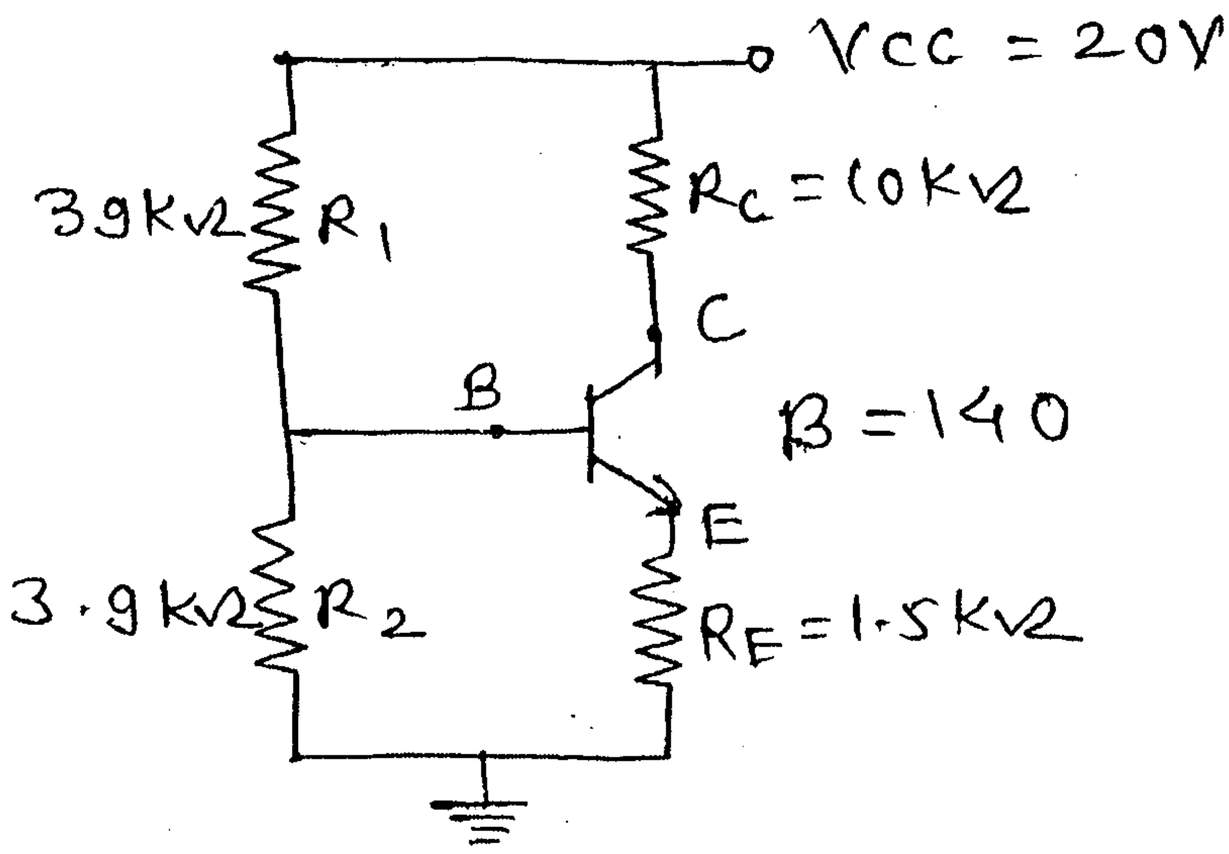
(d) Justify how FET can be used as variable resistor, constant source and constant voltage source. **5**

2. (a) Explain the graphical determination of the h-parameters using characteristic curve of CE amplifier. **10**

(b) Determine the following for the circuit shown in **figure** :– **10**

(i) I_{BQ} (ii) I_{CQ} (iii) V_{CEQ} (iv) V_{CQ} (v) V_{EQ} (vi) V_{BQ}

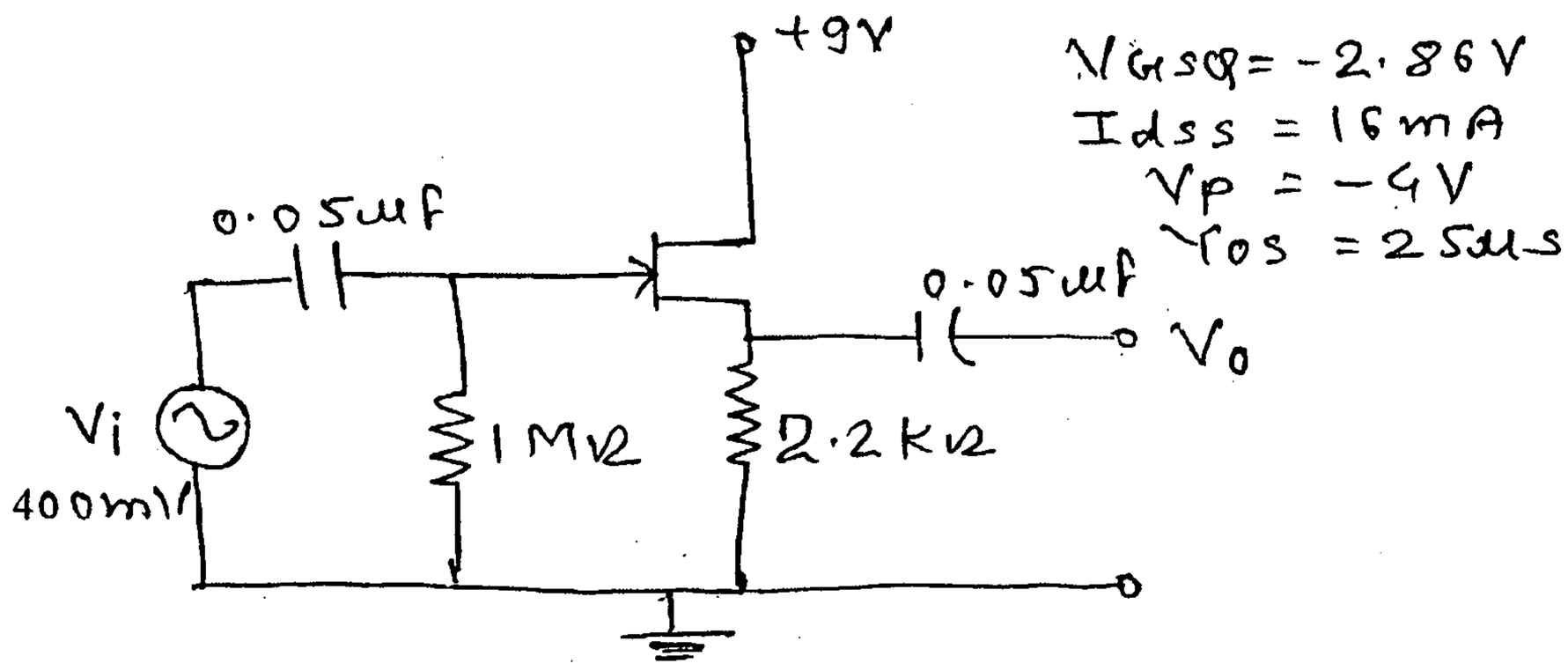
Use exact and approximate analysis to solve the same.



[TURN OVER

3. (a) Derive equations for Zi, Zo, Av, for common source configuration using voltage divider network (with unbypassed Rs). **10**

   (b) Calculate the voltage gain, input and O/P impedance for the circuit shown below:– **10**



4. (a) Explain any two applications of monostable multivibrator using IC 555. **10**

   (b) Design a regulator using LM 723 for $V_0 = 9$ V and $I_0 = 3$ Amps. **10**

5. (a) Explain the D/A converter using binary weighted resistor. **10**

   (b) Explain how an op-amp can be used as – (i) Integrator, (ii) Differentiator. **10**

6. (a) Explain Instrumentation amplifier with three OP-AMPs and derive overall gain Av. **10**

   (b) Using IC 555 design Astable multivibrator for output frequency at 5 kHz and duty cycle of 70%. Draw the related waveforms. **10**

7. Write short notes on (any **four**) :– **20**

   (a) Virtual ground concept of OP-AMP

   (b) Inverting Schmitt Trigger

   (c) Properties of Ideal OP-AMP

   (d) PLL

   (e) Zero crossing detector.

SE - SEM III (Comp) (Rev) May 2015
Data Structure & Files 2015|13

121 : 1ST HALF-13 (p)-JP

Con. 6456–13. **GS–6315**

(3 Hours) **[Total Marks : 100**

N.B. (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume **suitable** data whenever **required** but **justify**.
(4) **Illustrate** answers with **neat** sketches whenever **required**.

1. (a) Write a program in Java to implement circular Queue using array. **10**
   (b) Explain linear and non-linear data structure with example. **5**
   (c) Explain practical applications of trees. **5**

2. (a) Write a program in Java to copy content of a file to another file using command line argument. **10**
   (b) What are the advantages of linked list over array ? Write a program in Java to implement stack using linked list. **10**

3. (a) Write a program to implement insertion sort using Java. Show passes of insertion sort for the following input 15, 23, 22, 11, 44. **10**
   (b) Give different searching techniques. Write a program to implement binary search. **10**

4. (a) Explain different representations of graph. State advantages and disadvantages of each representation. **10**
   (b) Write a Java program to create a binary search tree. Show BST for the following input : 10, 05, 14, 22, 17, 01, 08. **10**

5. (a) Explain the method of Huffman Encoding. Apply Huffman encoding method for the sentence "MALAYALAM". Give Huffman code for each symbol. **10**
   (b) Hash the following in a table of size. 11 use any two collision resolution techniques. 23, 55, 0, 71, 67, 23, 100, 18, 10, 90, 44. **10**

6. (a) Write ADT for stack. Give applications of stack. **10**
   (b) Explain Priority Queue. **5**
   (c) Write a program in Java to create a linked list and perform the following operations : **5**
      (i) Insert into list
      (ii) Search for data
      (iii) Delete from list
      (iv) Display the list.

7. Write short notes on (any **two**) :— **20**
   (a) Tree Traversal Algorithms
   (b) Merge sort with example
   (c) AVL tree and multiway tree.

SE / CMPN / II (Rev.) 24/5/13
Digital Logic Design & Applications

23 : 1st half.13-AM(aa)

Con. 9152-13. **GS-6420**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Solve any **four** out of the remaining **six** questions.
(3) Draw neat **diagram** whenever **necessary**.

1. (a) Convert $(1234{\cdot}56)_{10}$ to octal, hexadecimal. **4**
(b) Represent $(29)_{10}$ into XS-3 and Gray code. **4**
(c) Design full adder using half adders. **4**
(d) Design a full subtractor using a decoder and additional gates. **4**
(e) Simplify and implement using gates **4**

$$Y = \overline{AB}\,(B + C) + AB\,\overline{(B + C)}$$

2. (a) What is canonical SOP and POS form ? Explain with an example. **5**
(b) Implement the following using only one 8 : 1 MUX and few gate **5**

$$F(A, B, C, D) = \sum m(0, 3, 5, 7, 9, 13, 15)$$

(c) Using the k-map method minimization technique simplify and draw the circuit **10**
for the following function,

$$F(A, B, C, D, E) = \sum m\,(0, 1, 2, 3, 5, 7, 8, 9, 11, 14, 16, 17, 18, 19) + d(24, 25)$$

3. (a) Simplify using Quine Mc-Cluskey method. Realize the equation using any **10**
universal gate.

$$F(A, B, C, D) = \pi M(0, 2, 3, 6, 7, 8, 9, 12, 13)$$

(b) Design a BCD adder using 4 bit binary adders and explain. **10**

4. (a) Design a 3 bit even and odd parity generator. **10**
(b) State truth table of 3 bit gray to binary conversion and design using 3 : 8 **10**
decoder and additional gates.

5. (a) Design MOD - 6 synchronous counter and explain its operation. **10**
(b) Draw a 4 bit universal shift register and explain. **10**

6. (a) Design 4 bit ring counter using J K ff, draw the timing diagram for the same. **10**
(b) Compare TTL and CMOS logic families. **10**

7. Write notes on the following (any **four**) :— **20**
(a) ALU (Arithmatic Logic Unit)
(b) PAL and PLA
(c) Race around condition
(d) Error detecting and correcting code
(e) Applications of flip flops and registers.

SE I CMPN | III (CR) 30/5/13
DSDT

mk.72-1st hlf 13-K

Con. 6572-13. **GS-6525**

(3 Hours) **[Total Marks : 100**

N.B. (1) Question No. **1** is **compulsory.**
(2) Attempt any **four** questions from remaining **six** questions.
(3) **Figures** to the **right** indicate **full** marks.
(4) Assume suitable **data** if **necessary.**

1. (a) Prove by Mathematical Induction — **8**

$$1^2 + 2^2 + 3^2 + \ldots\ldots n^2 = \frac{n(n+1)(2n+1)}{6}.$$

(b) Explain the terms :— **6**
(i) Poset
(ii) Normal Subgroup
(iii) Lattice.

(c) In a survey of 60 people, it was found that 25 reads Newsweek Magazine, 26 reads Times and 26 reads Fortune. Also 9 reads both Newsweek and Fortune, 11 reads both Newsweek and Times, 8 reads Time and Fortune and 8 reads no magazine at all. **6**
(i) Find the number of people who read all three magazines.
(ii) Determine number of people who read exactly one magazine.

2. (a) Define injective, surjective and bijective functions. **8**
if $f : R \to R$ and $g : R \to R$ are defined by the formulas —
$f(x) = x + 2$ and $g(x) = x^2$
Find (i) f.g.f. (ii) g.f.g.

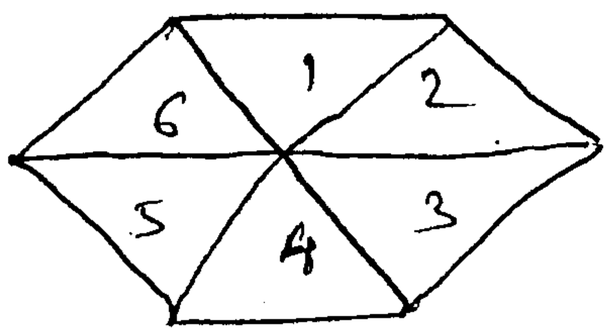
(b) Define equivalence relation on a set. Let R be a relation on the set of integers defined by aRb iff a–b is a multiple of 5. Prove that R is a equivalence relation. **6**

(c) State the converse, inverse and contrapositive of the following :— **6**
(i) If it is cold, then he wears a hat.
(ii) If an integer is a multiple of 2, then it is even.

3. (a) Explain Hasse diagram. Draw the Hasse diagram of the relation given by :— **8**
(i) R_1 = { (1, 1), (1, 2), (1, 3) (1, 4) (1, 5), (2, 2), (2, 3) (2, 4), (2, 5), (3, 3), (3, 4), (3, 5), (4, 4), (4, 5), (5, 5) }
(ii) R_2 = { (1, 1), (1, 3), (1, 4), (1, 5), (2, 2), (2, 3), (2, 4), (2, 5), (3, 3), (3, 4), (3, 5), (4, 4), (5, 5) }

(b) Let A = {1, 2, 3, 4} and R = {(1, 2), (2, 3), (3, 4), (2, 1)}. Find the Transitive closure of R using Warshall's Algorithm. **6**

(c) Consider the region shown below. It is bounded by a regular hexagon whose sides are the length 1 units. Show that if any seven points are chosen in this region then two of them must be no further apart than 1 unit. **6**



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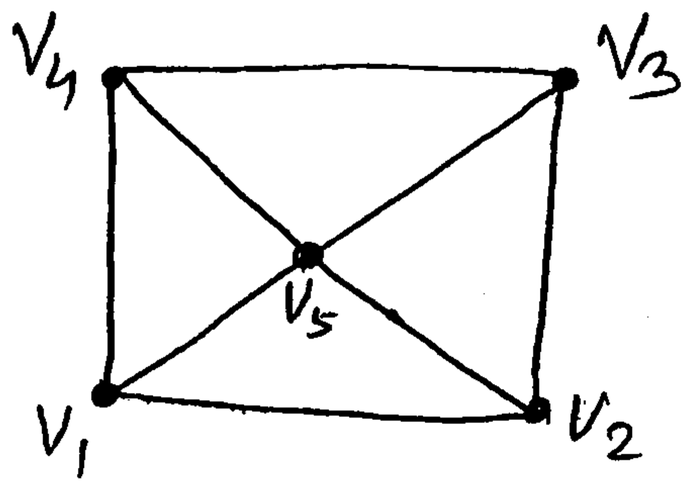
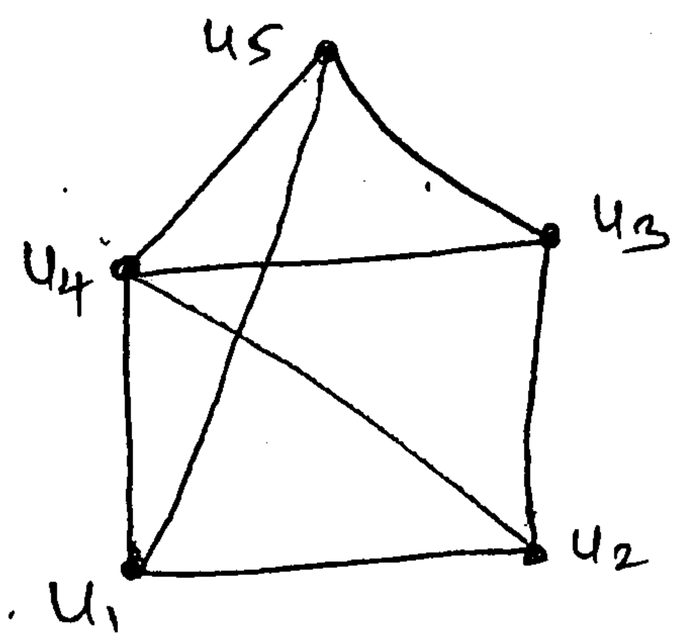
4. (a) Show that the following graphs are isomorphic. **8**





(b) Let R = {(1, 2), (4, 3), (2, 2), (2, 1), (3, 1)} be a relation on s = {1, 2, 3, 4}. Find the symmetric closure of R. **6**

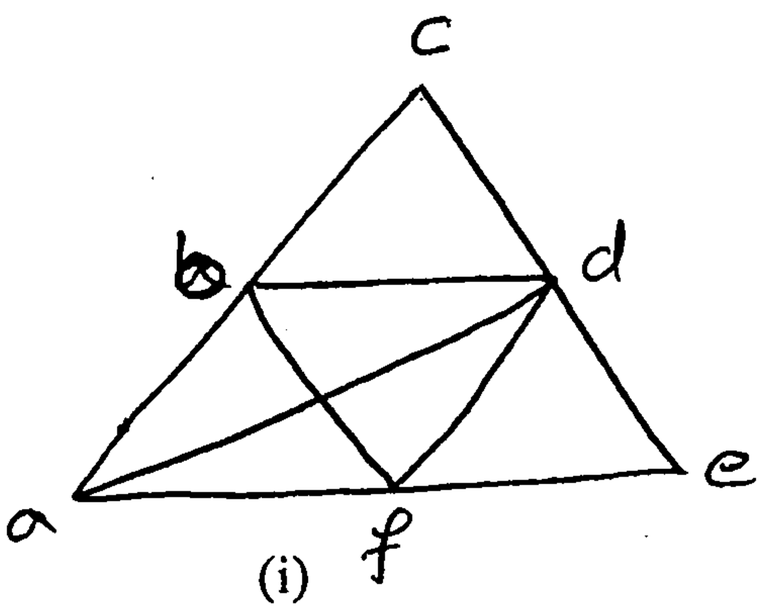
(c) Define : **6**

(i) Integral domain
(ii) Field
(iii) Normal Subgroup.

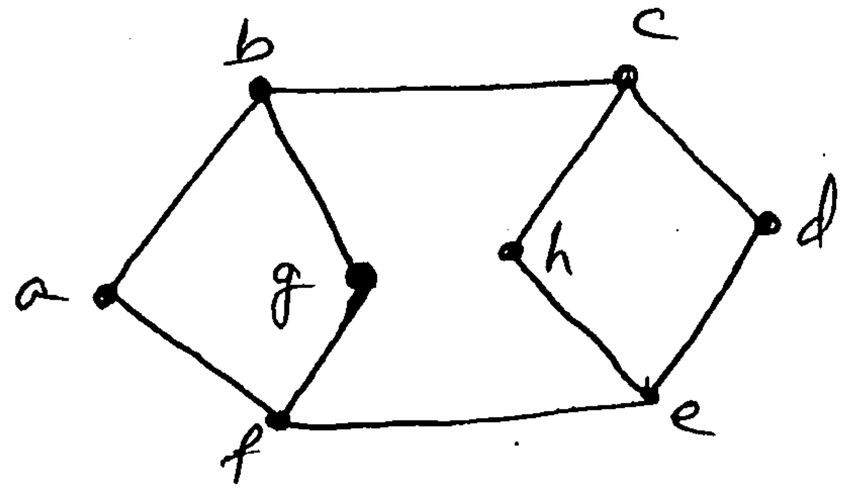
5. (a) What is a minimum spanning tree ? Explain any one technique with example. **8**

(b) Define Cyclic Group. Prove that the set A = {0, 1, 2, 3, 4, 5} is a finite abelian under addition modulo 6. **6**

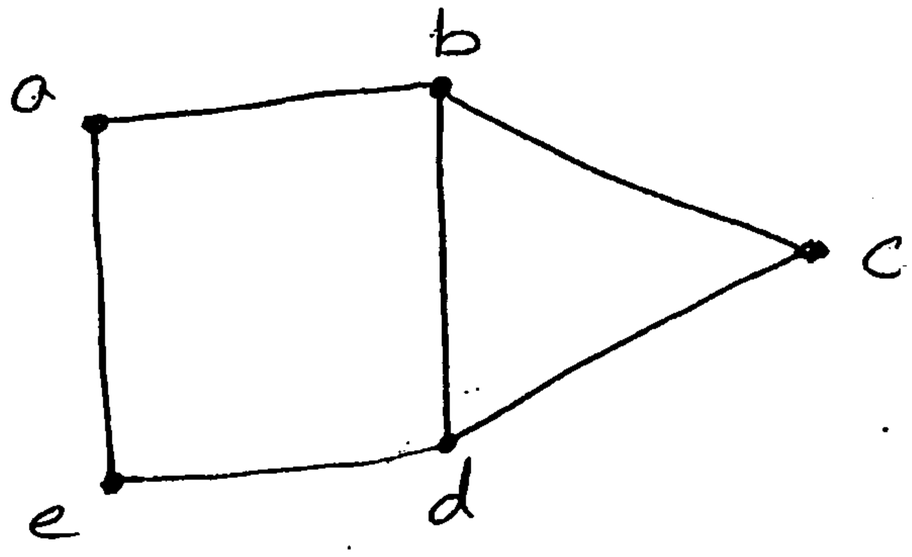
(c) Determine whether the given graph has a Hamilton circuit or Eulerian circuit. If it does, find such a circuit. **6**



(i)



(iii)



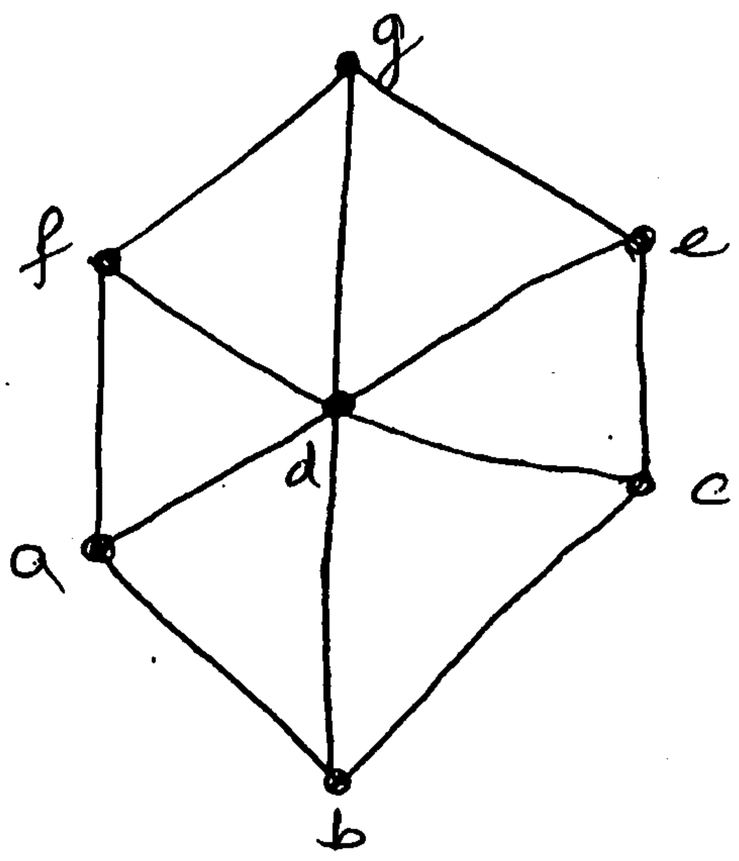
(ii)

6. (a) Consider the (3, 5) group encoding function $E : B^3 \rightarrow B^5$ is defined by — **8**

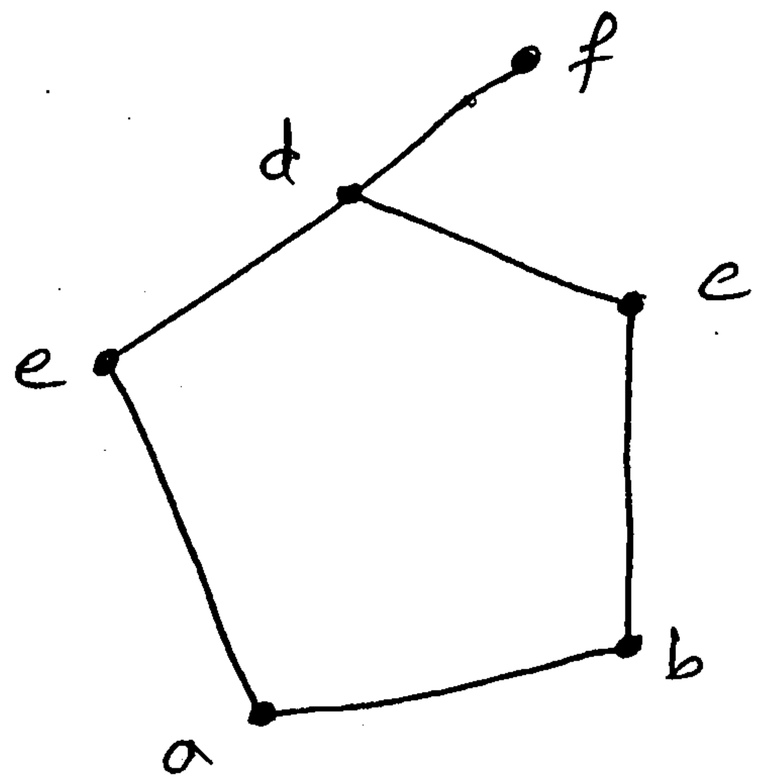
$E(000) = 00000$ $E(100) = 10011$
$E(001) = 00110$ $E(101) = 10101$
$E(010) = 01001$ $E(110) = 11010$
$E(011) = 01111$ $E(111) = 11100$

Decode the following words relative to a maximum decoding function :—
(i) 11001 (ii) 01010 (iii) 00111 (iv) 11100

(b) Which of the following diagram in the **figure** represents a lattice ? Justify. **6**



(i)



(ii)

(c) Define with example :— **6**
(i) Planer graph
(ii) Semigroup
(iii) Quantifiers.

7. (a) Find the solution to the recurrence relation :— **6**

$a_n = a_{n-1} + 2 \qquad n \geq 2$

subject to initial condition $a_1 = 3$.

(b) Find the complement of each element in D_{30}. **6**

(c) Find the generating function for each of the following sequence :— **8**
(i) {0, 1, 2, 3, 4, ...}
(ii) {1, 2, 3, 4, ...}
(iii) {2, 2, 2, 2, ...}
(iv) {0, 0, 1, 1, 1, ...}