Q.P. Code : **5627**

(3 Hours) [Total Marks :80

N.B. : (1) Questions No 1. is **compulsory.**
    (2) Attempt **any three** questions from the remaining questions.
    (3) Assume suitable data wherever possible.

1. (a) Explain various image representation techniques. 5
   (b) Explain haptic rendering pipeline. 5
   (c) Explain different types of virtual reality systems. 5
   (d) Differentiate between Raster scan and Random scan display 5

2. (a) Explain any computing architecture for virtual reality. 10
   (b) Explain sutherland Hodgeman polygon clipping algorithm. Clip polygon 10
     ABCDE against window PQRS. The coordinates of the polygon are
     A (80, 200), B (220,120), C (150,100), D (100, 30) and E (10,120). The
     coordinates of the window are P (200,50), Q (50,150), R (200,150) and S
     (200, 50).

3. (a) What is marphing and warping? Explain techniques used in morphine? 10
     Warping
   (b) With respect to 3D transformations, describe the steps to be carried out 10
     when an object is to be rotated about an arbitrary axis. Specify all the
     required matrices. State your assumptions clearly.

4. (a) Consider a triangle ABC whose coordinates are A (10, 20) B (30, 40) and 8
     C (50, 20). Perform the following transformations : (Specify the matrices
     that are used)
       (i) Translate the given triangle by 3 units in X direction and -2 units in
         Y direction.
       (ii) Rotate the given triangle by 30.
       (iii) Reflect the given triangle about $X = Y$
       (iv) Scale the given triangle uniformly by 2 units.
   (b) Write a function to fill a region whose boundaries are specified by different 8
     colours. Explain the algorithm.
   (c) Explain the test (s) to determine whether the point is inside or outside of 4
     polygon.

[TURN OVER

MD-Con. 8242-15.

Q.P. Code : **5627**

(3 Hours) [Total Marks :80

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   polygon.

[TURN OVER

QP Code : 5585

Total Marks : 80

Note : Q1 is compulsory.
Attempt any THREE out of the remaining questions.

Q1. Attempt any 4 sub questions

a) What are the characteristics of modern operating systems. (5 M)
b) What is internal and external fragmentation? (5 M)
c) What is a Process Control Block (PCB) ? (5 M)
d Define the terms critical section and race condition. (5 M)
e) Draw and explain process state transition diagram. (5 M)

Q2. a) Explain the conditions for deadlock. Also explain how the deadlock can be determined with the help of resource allocation graph. (10 M)
b) Explain different kernel architectures in detail (10 M)

Q3 a) On a disk with 1000 cylinders, number 0-999. Compute the number of tracks the disk arm must move to satisfy all request in the disk queue. Assume the last request received was at track 345 and the head is moving towards track 0. The queue in FIFO order contains request for the following tracks. 123, 874, 692, 475, 105 , 376. (10 M)
Perform the computation for the following scheduling algorithms.
i. FIFO   ii. SSTF   iii. SCAN.
b) Explain different types of schedulers. (10 M)

Q4 a) Explain File Allocation methods in detail. (10 M)
b) Consider the following page reference string (10 M)
1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6
how many page faults would occur for the following replacement algorithms assuming three, five frames for LRU, FIFO and Optimal Replacement.

Q5. a) Brief the evolution of an OS
b) Consider the given snap of the system (10 M)

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	2	1	2	0	3	2	2	2	5	3	2
P1	1	1	0	2	2	7	5	2				
P2	2	2	5	4	2	3	7	6				
P3	0	3	1	2	1	6	4	2				
P4	2	4	1	4	3	6	5	8				

Answer the following questions using Banker's algorithm

[TURN OVER]

(i)   What is the content of Matrix *need?*
(ii)   Is the system in safe state?
(iii)   If a request from process P1 arrives for (1,3,2,1) can the request be granted immediately?

Q6   Write notes on (any two)   (20 M)
       a) Multithreading
       b) Linux File system
       c) Producer Consumer Problem.
       d) RAID.

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Q.P. Code : 5668

(3 Hours) [Total Marks : 80

Note the following instructions:
1. Question no.1 is compulsory.
2. Solve any three questions out of remaining five questions.
3. Assume suitable data if necessary.
4. Draw neat diagrams wherever necessary.

1. a) What are the specialties of Embedded Systems? (4)
   b) What are the major components of 8051 microcontroller? (3)
   c) Explain in brief Assembler Directives with respect to 8051 assembler. (3)
   d) Explain in brief the principal features of the ARM architecture. (3)
   e) Explain in brief Real Time Operating Systems. (4)
   f) Explain in brief features of DSP and SOC. (3)

2. (a) Explain in details pipelining in ARM7 processor? (10)
   (b) What are the Addressing Modes of 8051 microcontroller? (10)
   Explain with example in each addressing mode.

3. (a) Explain functions of Program Status Word Register, Timer Control Register (10)
   and Interrupt Priority Register in 8051 microcontroller.
   (b) Explain how Exceptions and Interrupts are handled in ARM 7. (10)

4. (a) Assuming crystal frequency =11.0592 MHz, write an Assembly Language (10)
   Program for 8051 to generate square wave of 50 Hz at port pin P2.3
   Draw circuit diagram to implement the same.
   (b) List Task scheduling algorithms. Explain operation of each of the algorithms. (10)

5. (a) List the Kernel objects and explain functions of each of the objects. (10)
   (b) Explain with block diagram design of Battery Operated Smart Card Reader. (10)

6. Write short note on the following
   (a) Digital Clock as an embedded system. (7)
   (b) Serial Port Communication in 8051. (6)
   (c) Addressing Modes of ARM 7 processor. (7)

QP Code : 5711

(Time: 3 Hrs)   Marks: 80

N.B. : 1. Question no. 1 is **compulsory**.
      2. Solve any **Three** questions out of remaining **Five** questions.

Q-1   a)   Justify Write-Ahead Logging (WAL) protocol for a recovery algorithm that   5
          requires both UNDO and REDO.

      b)   What is a view? Discuss the difference between a view and a base relation.   5

      c)   Explain Factless Fact Table.   5

      d)   What is role of metadata in data warehouse?   5

Q-2   a)   What are the different types of SQL injection attacks? What risks are   10
          associated with it?   Explain any one attack in detail.

      b)   Vaidehi Foods & Beverages is a new company which produces Dairy, Bread   10
          and Cookies products with production unit located at Kharghar, Navi
          Mumbai. These products are sold in selected regions of India. They have
          sales units at Mumbai, Pune, Satara, Sangli and Kolhapur. The President of
          the company wants sales information.

         1. Find the dimensions of data warehouse for given problem statement and
           justify your answer.

         2. State and represent the concept hierarchy for each dimension.

         3. If the president of company wants the report: The number of items sold
           and income in each region for each product with time.

           3.1. Explain at which concept hierarchy level the query will be?

          3.2. Write ROLAP/MOLAP query.

         4. Describe the Rollup or Drilldown OLAP operations.

Q-3   a)   What are the roles of the Analysis, Redo and Undo phases in ARIES? Explain   10
          with suitable example.

      b)   Consider the following database that has to be distributed: 10

         PROJ (**PNO**, PNAME, BUDGET)
         PAY (**TITLE**, SALARY)
         EMP (**ENO**, ENAME, TITLE)
         ASG (**ENO, PNO**, RESPONSIBILITY, DURATION)

          1. Show 2 examples of horizontal fragmentation.
          2. Show 1 example of derived fragmentation.
          3. Show 1 example of vertical fragmentation.

Turn over

QP Code : 5749

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

N.B. (1) Question number 1 is compulsory.
     (2) Solve any 3 from remaining.
     (3) Assume suitable data where ever necessary.

Q.1. Attempt the following: 20
    a. compare amongst hard and soft links
    b. Explain Linux file access permissions
    c. List 5 Environment variables. Describe their role.
    d. Explain Activity Life-cycle using neat Labeled diagram

Q.2.
(a) Explain role of /etc/passwd, /etc/shadow, /etc/group files with respect to user administration
                   10
(b) Write short note on 'working with web using shell script'   10

Q3.
(a) Explain use of grep command. Also give examples of use of c, i and v option with grep   10
(b) Write a note on process management in linux along with the relevant command for process management.   10

Q4.
(a) Explain File System Hierarchy (FHS) of Linux   10
(b) Explain various pipes and redirects   10

Q5.
(a) Explain role of Logical Volume Manager in Linux Kernel   10
(b) Explain the use of following Networking commands: i) ping ii) arp iii) host iv) traceroute v) ifconfig   10

Q6
(a) Publishing the Android application   5
(b) What are different layouts possible for a view derived from ViewGroup base class   5
(c) Describe role of Intent in Android Programming   5
(d) What is the role of init signal   5

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