TE Sem V – IT, CBSGS
Computer Graphics & virtual reality

Q.P Code: 23469

[Time: 3 Hours] [Marks: 80]

NB : 1) **Question 1** is **compulsory**.
2) Attempt any **three** questions from the **remaining** questions.
3) **Assume** suitable **data** wherever applicable.

1 (a) Explain various image representation techniques. 5

(b) Explain parallel and perspective projections 5

(c) Explain the differences between computer graphics and virtual reality. 5

(d) Explain any test to determine whether the point is inside or outside of polygon. 5

2 (a) Explain graphics rendering pipeline for virtual reality. 10

(b) Explain Sutherland Hodgeman polygon clipping algorithm. State its drawbacks and explain how it can be solved. 10

3 (a) What is the significance of modeling in virtual reality? Explain any modeling technique. 10

(b) With respect to 3D transformations, describe the steps to be carried out when an object is to be rotated about an axis that is not parallel to any of the coordinate axis. Specify all the required matrices. State your assumptions clearly. 10

4 (a) State mathematical equation for Bezier curve. Find the Bézier curve which starts at $\{x_0, y_0\} = \{2, 2\}$ and ends at $\{x_3, y_3\} = \{4, 1\}$ which has the control points $\{x_1, y_1\} = \{0, 1\}$ and $\{x_2, y_2\} = \{3, -1\}$, respectively. 10

(b) Write a function to fill a region boundary by different colour boundaries using connected approach. Explain the algorithm with example 10

5 (a) Consider a triangle ABC whose coordinates are A (1, 2), B (3, 4), C (5, 2). Perform the following transformations: (Specify the matrices that are used) 10

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 Y axis
iv) Scale the given triangle uniformly by 2 units in X and Y direction
v) Reflect the given triangle about X=Y

(b) Draw a line from (-10, 15) to (-20, 25) using Bresenham's line drawing algorithm. 10

6 Write short note on **(any four)** 20

(a) Fractals
(b) Types of virtual reality systems.
(c) Color models
(d) B-spline curve
(e) Application of virtual reality

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Correction in QP Code: 23469

1 message

University of Mumbai <support@muapps.in> Fri, Nov 24, 2017 at 4:19 PM
Reply-To: University of Mumbai <support@muapps.in>
To: vasaikarhb@spit.ac.in

University of Mumbai

Correction in Program Code: T3325 - T.E.(INFORMATION TECHNOLOGY)(SEM V) (Rev-2012) (CBSGS) / T0527 - COMPUTER GRAPHICS AND VIRTUAL REALITY **QP Code: 23469**

Q.4 (b) Write a function to fill a region boundary by different colour boundaries using **4 and 8** connected approach. Explain algorithm with example.

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Microcontroller & Embedded Systems

TE. Sem-V CBGS – IT. 30/11/2012 **Q. P. Code : 23701**

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

N.B. 1. Question No 1 is compulsory.

2. Solve any **three** questions out of remaining five questions.

3. Assume suitable data if necessary.

4. Figures to right indicate marks.

Q. 1. Solve any **four** out of five. (20)

1. a. What are the design metrics of Embedded Systems?
   b. Describe the instructions of 8051 , JNC and MUL with one example.
   c. 8051 microcontroller with XTAL frequency = 11.0592 MHz. Find the TH value needed to have the following baud rates of 9600.
   d. Describe the feature of ARM that makes it suitable for embedded system.
   e. What is semaphore? Explain the use of semaphore with respect to embedded operating systems.

Q. 2. a) Discuss Smart Card Reader System in detail. (10)

b) Illustrate scheduling algorithms of tasks in real time systems (10)

Q. 3. a) Explain multiple register load and store instructions of ARM7 processor. (10)

b) Write assembly language program to generate a rectangular waveform of frequency 1KHz and 50% duty cycle at pin P1.7 using 8051. Assume 8051 operating frequency 12MHz. (10)

Q. 4. a) Write assembly language program for 8051 microcontroller to transfer message "ARM7" serially at baud rate of 2400 in mode 1. (10)

b) Explain with one example each, the addressing modes of 8051 microcontroller. (10)

Q. 5. a) Define and classify the embedded systems also list major application areas of embedded systems. (10)

b) Give details of Barrel Shifter of ARM7 processor and the various operations carried out by the same. (10)

Q. 6. a) List functions of Kernel. Also explain different types of kernel. (10)

b) Explain interrupt structure of 8051 microcontroller in detail. (10)
