

**COLLEGE OF ENGINEERING, PUNE**  
**(An Autonomous Institute Of Government Of Maharashtra)**  
**Department of Computer Engineering & Information Technology**  
**T.Y.B.TECH (I.T.) 2013-14**  
**Subject: IT 09003 Computer Graphics and Multimedia**  
**EndSem Examination**

**Total Marks: 60**

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- Q.1) A What is scan conversion? Explain need and side effects of scan-conversion. 3  
B Find the condition under which rotation and shearing in both direction are commutative. 3  
C Explain 4-connected and 8-connected method for region filling. Give their advantages and dis-advantages. 4
- Q.2 A Derive equation for parallel projection of an object onto xy plane in the direction of projection vector  $v = aI+bJ+cK$ . 5  
B List different methods for controlling animation. Explain any one of them. 5
- Q.3) A What is the use of authoring tools in multimedia system? Explain their various types. 5  
B Explain motion vector and motion compensation in context with video compression. 5
- Q.4) A State and explain Nyquist theorem. Consider a rotation of a second hand of a clock. What will be samples recorded if second hand of a clock is sampled at: a)  $T_s = T/2$  b)  $T_s = T/4$  and c)  $T_s = 3T/4$  (for 2 continuous cycles). Using the observations recorded in a), b) and c) give advantages/disadvantages of over sampling, under sampling and sampling with Nyquist rate. ( $T_s$  is sampling interval,  $T$  is time for one rotation, **assume 1<sup>st</sup> value recorded for all different sampling rate is 12**). 6  
B What is entropy according to Shannon's Theory? What is entropy of:  
a) A source with  $M$  symbol where each symbol is equally likely to occur? 4  
b) Image in which half of pixels are white and half of pixels are black.
- Q.5) A What are basic components of multimedia system? List different applications where multimedia is used. 3  
B State Huffman coding algorithm for compression. Code the message  
**BABACACADADABBCBABEBEDDABEEEBB**  
using same. List and explain properties of Huffman coding algorithm. 7
- Q.6) A Explain JPEG compression technique with the help of block diagram. 7  
B a) Assume an audio signal is passed through a low pass filter of 8kHz bandwidth. What should be the sampling rate for digitization? 3  
b) A complex bandpass signal has a bandwidth of 200 kHz. What is the minimum sampling rate for this signal?