



**SLIATE**

*SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION*

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

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**Higher National Diploma in Information Technology**

**Second Year, Second Semester Examination – 2015**

**IT41- Graphics and Multimedia Processing**

Instructions for Candidates:

Answer **any five (5) questions**

All questions carry equal marks

No. of questions : 08

No. of pages : 04

Time : Three (03) hours

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**Question:01**

- (i) What is an image? (02 Marks)
  - (ii) Explain the difference between analog and digital images. (06 Marks)
  - (iii) Define terms “sampling” and “quantization” with reference to digital images. (06 Marks)
  - (iv) How is the color system **HSV** constructed? (03 Marks)
  - (v) Explain how a color image can be stored in the computer memory. (03 Marks)
- (Total 20 marks)**

**Question: 02**

- (i) Define following properties of video display devices. (04 Marks)
    - a) Aspect ratio
    - b) Resolution
  - (ii) Briefly explain the terms “raster graphics” and “vector graphics”. (04 Marks)
  - (iii) Write the two (02) techniques for producing color displays with a CRT. (05 Marks)
  - (iv) What is ‘vertical retrace’ and ‘horizontal retrace’ of the electron beam?(04 Marks)
  - (v) Explain the difference between raster scan display and vector scan display. (03 Marks)
- (Total 20 marks)**

**Question: 03**

- (i) Define 4, 8 & m adjacency. (06 Marks)
- (ii) Explain the significance of connectivity analysis between pixels. (03 Marks)
- (iii) Define the connectivity between two pixels. (03 Marks)
- (iv) Following table shows the data extracted from a digital image

0	0	0	0	0	0	0
0	1	1	0	0	0	0
0	1	1	0	0	0	0
0	0	0	1	1	1	0
0	0	0	1	1	1	0
0	0	0	0	0	0	0

- a) If  $V = \{1\}$ , how many connected components can be identified in this image by considering 4 adjacency. (03 Marks)
- b) Get the output matrix after applying connected component labeling. (05 Marks)

**(Total 20 marks)**

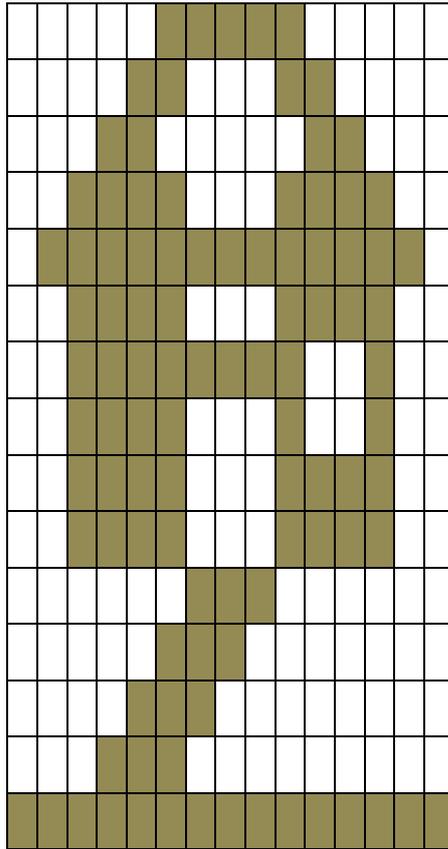
**Question: 04**

- (i) Define the term 'Computer graphics'. (03 Marks)
- (ii)
  - a. What is digital image processing? (02 Marks)
  - b. List down three (03) basic application areas of digital image processing. (03 Marks)
- (iii) Explain the benefits of graphics applications considering three (3) areas. (08 Marks)
- (iv) What is the histogram of an image? Explain briefly. (04 Marks)

**(Total 20 marks)**

**Question: 05**

- (i) What is image compression? (02 marks)
- (ii) List two (02) advantages and two (02) disadvantages of image compression. (04 marks)
- (iii) Explain the terms 'image encoding' and 'image decoding'. (06 marks)
- (iv) Encode the following image using 'run length coding' method (08 marks)



**(Total 20 marks)**

**Question: 06**

- (i) What are the major steps involved in multimedia application development process from planning to publishing? (05 marks)
- (ii) “Target audience is a key requirement of multimedia application development”. Explain this statement giving relevant facts. (06 marks)
- (iii) List out three (03) components of a multimedia system. (03 marks)
- (iv) Write short notes about following team members. (06 marks)
  - a) Content specialist
  - b) Multimedia architect

**(Total 20 marks)**

**Question: 07**

- (i) List out four (04) image file formats. (04 marks)
- (ii) Which are the two (02) basic redundancies that can be identified in digital images? (02 marks)
- (iii) Define the following terms. (09 marks)
  - a) Compression Ratio
  - b) Image quality
  - c) Data Redundancy
- (iv) Explain the difference between Lossy and Lossless compression techniques. (05 marks)

**(Total 20 marks)**

**Question: 08**

- (i) What is an animation? (04 Marks)
- (ii) State and explain two (02) types of animation techniques. (04 marks)
- (iii) Explain the relationship between frame rate and quality of an animation. (04 marks)
- (iv) Explain at least four (04) facts that can be used to increase the realistic effect of an animation. (08 marks)

**(Total 20 marks)**