

Seat No. : \_\_\_\_\_

**NR-119**

**November-2017**

**5<sup>th</sup> Year, M.Sc. (CA & IT) (Integrated)**

**Image Processing**

**Time : 3 Hours]**

**[Max. Marks : 100**

**Instruction :** Draw figure wherever necessary.

1. Answer the following : **4 × 5 = 20**

- (1) Explain the applications of Gamma rays, X-rays and Ultraviolet rays with proper examples.
- (2) Define: Digital Image Processing. Explain the steps of Image Processing.
- (3) Explain Electromagnetic spectrum and relation between frequency, wavelength and energy.
- (4) Explain the structure of human eye.

2. (A) Answer the following : (any **two**) **2 × 5 = 10**

- (1) Explain the different methods for zooming and shrinking images.
- (2) Write short note on image formation model.
- (3) Write the conditions for m-adjacency. Justify with proper reasons the elements represented with \* are 8-adjacent and m-adjacent or not.

0    1    1

0    \*1    0

0    0    \*1

(B) Define / explain the following : **10**

- (1)  $N_D(p)$
- (2) Digital Path
- (3) Boundary
- (4) Euclidean distance
- (5) Linear Operations
- (6) Dynamic range of an image
- (7) Sampling and Quantization
- (8) Sensor
- (9) Chromatic Light
- (10) Bright light vision

3. Answer in brief : (any **four**) **4 × 5 = 20**
- (1) Explain Gray level slicing and Bit plane slicing.
  - (2) What is histogram equalization and histogram specification ? Summarize histogram specification.
  - (3) Explain image sharpening using first and second order derivatives.
  - (4) Define: Fourier Transform. Write the basic steps for filtering in frequency domain.
  - (5) Explain with formula different types of mean filters.
4. Answer any **four** : **4 × 5 = 20**
- (1) Define : Periodic Noise. Explain with formula Band Pass and Band Reject filters.
  - (2) Write a short note on Adaptive Median filters.
  - (3) Explain the different ways of estimating the degradation function.
  - (4) Write formula to convert from HSI model to RGB model for RG, GB and BR sector.
  - (5) Explain the characteristics of colour. Write a brief note on RGB colour cube.
5. Answer the following :
- (A) What is data redundancy ? Write short note on Coding Redundancy, Interpixel redundancy and Psychovisual redundancy. **10**
- (B) Answer the following : **10**
- (1) Write the formula to find redundancy.
  - (2) Explain subjective fidelity criteria.
  - (3) Draw the block diagram of Source encoder and decoder model.
  - (4) Give examples of Lossy compression.
  - (5) Define: File format.
  - (6) List the various bitmap file format.
  - (7) Explain passive remote sensing.
  - (8) List the components of Machine vision system.
  - (9) Give examples of Clinical medical imaging.
  - (10) Briefly explain Document image processing.
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