Hall Ticket Number:

Code No. : 21501

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

M.E. (ECE: CBCS) I-Semester Main Examinations, January-2018

(Communication Engineering & Signal Processing)

Image and Video Processing

Time: **3** hours Max. Marks: **60**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

1. Define 4-, 8- and m-connectivity.
2. Differentiate between sampling and quantization of a digital Image.
3. Explain bit plane coding used in image enhancement.
4. Define median filtering and mention its features.
5. Mention any two differences between lossy and lossless compression techniques.
6. Define data redundancy and mention different types of data redundancy.
7. Describe digital image formation model with the help of a block diagram.
8. Define image aspect ratio and mention the same for SDTV and HDTV.
9. Explain backward and forward motion estimation.
10. Write in brief, about 3-D motion vector.

Part-B (5 × 8 = 40 Marks)

(All sub-questions carry equal marks)

11. a) Discuss any two applications of digital image processing, in detail.
    b) Consider the image segment shown below. For V = (0,1), compute the lengths of the shortest 4, 8 and m-path between *p* and *q*. If a particular path does not exist between these two points, explain why.

3	1	2	1*(q)*
2	2	0	2
1	2	1	1
*(p)*1	0	1	2

12. a) Describe the role of smoothing filters in image enhancement.
    b) Explain image segmentation using different types of thresholding.
13. a) Obtain arithmetic coding and decoding process for "DAD" with a detailed explanation.
    b) Explain bit-plane coding with suitable examples.
14. a) Discuss about various standards used in digital video.
    b) Differentiate between NTSC, PAL, SECAM TV systems.
15. a) Derive optical flow equation and explain about optical flow estimation.
    b) Explain block matching motion estimation and its advantages.
16. a) Determine the kernel coefficients of 2-D DCT for N = 4.
    b) Explain region splitting and merging as part of image segmentation technique.
17. Write short notes on any ***two*** of the following:
    a) JPEG standards.
    b) Photometric image motion model.
    c) Region based motion estimation model.