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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.

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12. a) What are the traits of a good listener? How can ensure that the other person is actively listening to you or not?
- b) How is empathetic listening different from critical listening? Discuss the two types of listening with an example each.
13. a) What are the dos and don'ts of an effective presentation and speeches?
- b) Write a situational dialogue between the team leader and the member about resolving a technical problem that occurred in the final stage. Make sure that each of them gets at least four turns excluding greetings and leave taking.
14. a) What are the essential qualities of an efficient reader? What are the advantages of reading skills?
- b) Supply the missing word from the choices provided.
- When people breath, pollutants in the air \_\_\_\_ (i) in the lungs or absorbed into the body. And polluted air can harm animals and plants \_\_\_\_ (ii) people. For this reason, our air supply should be \_\_\_\_ (iii) watched and managed to assure \_\_\_\_ (iv) good quality.
- (1) have deposited, are depositing, had to be deposited, will have deposited, may be deposited
- (2) as well as, in addition, even if, in spite of, supposing
- (3) alternately, previously, hastily, closely, furtively
- (4) them, its, his, theirs, it
15. a) What are the dos and don'ts of email etiquette?
- b) Write a letter of enquiry to the General Manager, LG Electronics Ltd., about detailed information on the product that you would like to purchase.
16. a) Do you think that language is used as a tool of communication? Elaborate the characteristics of language in relation to communication.
- b) What are the barriers of listening skills in formal and informal communication? Exemplify.
17. Answer any *two* of the following:
- a) 'Speak clearly, if you speak at all; carve every word before you let it fall.' Discuss the significance of clarity, brevity, fluency and nuances of delivery for effective speaking.
- b) What are the basic steps to effective reading and discuss the sub-skills of reading?
- c) Submit your own resume for the post of Software Engineer in TCS, Hyderabad.

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