



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2018

Course: Digital Image Processing (GIEG321)

Semester: VII

Programme: B.Tech ASE-AVE

Time: 03 hrs.

Max. Marks: 100

Instructions:

SECTION A

All questions are compulsory

S. No.		Marks	CO
Q 1	Differentiate between image enhancement and image restoration with example.	4M	CO1
Q 2	Define the following terms: (i) Image (ii) Resolution (iii) Pixel and (iv) Digital Image	4M	CO2
Q 3	What are the applications of Image segmentation?	4M	CO3
Q 4	What is the significance of adaptive filter? Determine the expression for its variance.	4M	CO4
Q 5	Define Fourier spectrum and Phase angle of 2D-DFT.	4M	CO4

SECTION B

All questions are compulsory and each carries 10 marks.

Q 6	Explain Spatial filtering in Image enhancement	10M	CO3
Q.7	Discuss the limiting effect of repeatedly applying a 3x3 low-pass spatial filter to a digital image. You may ignore border effects. Is this effect different from applying 5 x 5 filter?	10M	CO3
Q.8	Detail the image noise model and different noise probability functions to support its features.	10M	CO4
Q.9	Detail the all-Tomographic reconstruction techniques. Detail the all Mathematical expressions to Radon Transform and Sinograms of Radon Transforms	10M	CO4

SECTION-C

Attempt any two questions and each carries 20 marks

Q.10	Draw the frequency response curve of low pass, high pass, Band pass and Band reject filters with respect to image filtering operations and suggest the suitable example of each.	20M	CO2
Q.11	Consider an image 500*500 pixels to be enlarged 1.5 times.Explain the procedure how to enlarge an image of size 500*500 using image interpolation.What is the best method used to perform the interpolation?	20M	CO1
Q.12	(a) Explain the role of median filter in image processing. Compute the value of the marked pixels shown in 3 x 3 mask.	10+10 M	CO3+ CO4

$$\begin{bmatrix} 16 & 21 & 32 & 24 & 30 & 24 \\ 33 & 125 & 26 & 120 & 26 & 20 \\ 21 & 20 & 32 & 31 & 15 & 26 \end{bmatrix}$$

(b) Detail the wavelet decomposition technique using HAAR wavelet. Consider 256 x 256 DWT and decompose the image shown in fig till 2nd level.

Input Image 

