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BACHELOR OF VOCATION
Automotive Mechatronics
Subject: Digital Signal Processing
Subject Code: ABEC-301
Semester: Fifth
September 2020
Theory (External): 35 Marks
Time: 03 hours

INSTRUCTIONS TO THE STUDENTS

1. Read the questions carefully and write the answers in the answer sheets.
2. Wherever necessary, the diagram drawn should be neat and properly labelled.
3. This questions paper comprises of 6 questions out of which student need to attempt any 3 questions.
4. All questions carry equal marks.
5. The time allotted will be 3 hours for examinations including time of downloading of question paper to emailing of answer books to the concerned Dean/IC.

ESSAY TYPE QUESTIONS

1. Obtain the 8 point DIF and DIT FFT of given sequence $\{8,8,8,0,1,4,2,3\}$
2. State the desirable properties required to convert an analog filter to a digital IIR filter.
Give methods for the same.
3. Describe the process of frequency domain sampling and reconstruction of discrete time signals.
4. Explain digital filter banks and its types.
5. Find the output response of the discrete time system described by the following difference equation $y[n]-0.75y[n-1]+0.166y[n-2]=x[n]$ where $x[n]=\frac{1^n}{5}u[n]$ subjected to the initial conditions $y[-1]=0$ and $y[-2]=1$. Also find out the step response.
6. (a) Realize the given system in direct Form-I
$$y[n] = 0.5y[n-1] - 0.25y[n-2] + x[n] + 0.4 x[n-1]$$

(b) State and prove any two properties of Z transform.

***** END OF PAPER*****