|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Q-1**. | **Mark True/False for the given statement. Write corrected statement if you found false.** | | | | | | |
|  | (a) | | The basic purpose of sampling is to discretize the analog signal. | | | | |
|  | **TRUE** | | | | | | |
|  | (b) | | | A band limited low pass signal is sampled at Nyquist rate with fs = 5000sps. The signal is band limited to 2000Hz. | | | |
|  | **FALSE** | | | | | | |
|  | (c) | | The basic Principal used to reconstruct the signal x(t) from x[n] is interpolation | | | | |
|  |  | | **TRUE** | | | | |
|  |  | |  | | | | |
| **Q-2.** | **For a case study of sampling of audio song which consist several instruments along with vocal frequency. Highest effective frequency component of instruments are listed below. Consider composite signal is band limited signal.** | | | | | | |
|  | **Flute : 16 KHz** | | | | **Tabla : 800 Hz** | | **Vocal : 3.2 KHz** |
|  | **Congo : 600 Hz** | | | | **Guitar : 15 KHz** | |  |
|  | **Considering above description match the following** | | | | | | |
|  | 1. Highest Frequency **B** | | | | | 1. 31.25 μs | |
|  | 1. Aliasing **D** | | | | | 1. 16 KHz | |
|  | 1. Low Pass Signal **C** | | | | | 1. Band Limited Signal | |
|  | 1. Nyquist Frequency **E** | | | | | 1. = 25 KHz | |
|  | 1. Nyquist Interval **A** | | | | | 1. 32 KHz | |
|  |  | | | | | | |
| **Q-3.** | **Name the type of filtered used for reconstruction of signal. From your observation, comment on reconstructed signal through various orders of the filters.**   * Low pass filter.   Reconstructor filter  OR  Anti Aliasing Filter | | | | | | |
| **Q-4.** | **Determine Nyquist rate for the following signals.** | | | | | | |
|  | 1. y(t) = 6 sin(200t) | | | | | 1. x(t) = 12 cos2(120πt) | |
|  | W=2if =200 | | | | | W = 2IF = 120x | |
|  | F=200/2x | | | | | F=120x/2x | |
|  | = 100/x | | | | | F=60HZ | |
|  |  | | | | |  | |
| **Q-5.** | **Determine the minimum Sampling frequency to be used to avoid sampling.** | | | | | | |
|  | x(t) = 5 sin (100 πt) cos (400 πt). | | | | |  | |
|  | X(t) = 5 sin(100xt) \* cos(400xt) | | | | |  | |
|  | **= 5\*1/2 sin (500xt)+sin(-300xt)** | | | | |  | |
|  | * **In Above equation higher frequency = 500xt now, W=2xf-500py** | | | | |  | |
|  | * **250HZ = highest frequency** | | | | |  | |
|  |  | | | | |  | |
|  |  | | | | |  | |
| **Q-5.** | **To explore interpolation three cases are given with sample instances. Just mark sample point right side and join them with scale. Comment on result for 1 sample per cycle, 2 sample per cycle and 3 sample per 2 cycle.** | | | | | | |
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| **Select the learing outcomes during your observation/performance of this experiment.** | | | | | | | |
|  | | 1. I have learn the role of Nyquist criteria into the reconstruction of sampled signal. | | | | | |
|  | | 1. I have calculated the requried bandwidth of digital output of continous signal. | | | | | |
|  | | 1. I have observed that 4th order Lowpass filter perform better than 2nd order Lowpass filter interms of cross talk. | | | | | |
|  | | 1. I have observed the effect of duty cycle of sampling signal on sampled and reconstructed signals. | | | | | |