ENSC3015 Class Test 3 Summary & Feedback

Q1. Hard

a. Some students used direct integration to calculate X[k];
b. Using a wrong GCF (should be 2pi, but a few used 6pi);
c. When using Euler's equation to interpret sin terms, typical mistakes are $sin\theta = \frac{1}{2}(e^{j\theta} - e^{-j\theta})$ or $sin\theta = \frac{1}{j}(e^{j\theta} - e^{-j\theta})$ or $sin\theta = \frac{1}{2j}(e^{j\theta} + e^{-j\theta})$;
d. When using Euler's equation to interpret sin terms, some converted the sin terms to cos term, which is not necessary;
e. Many students forgot to state the X[k]=0 for k values other than ± 1 and ± 3;

Q2.Medium-Hard

a. Many students have troubles on the calculation of integration of exponential function, say some forgot "j" term and some forgot "-" sign.
b. A few students used the features of odd function to determine the X[k], but most got incorrect answers;
c. Some students didn't simplify the final answer.
d. Note that the correct answer of this question has many formats, e.g.:

$$X[k] = \frac{3j}{2k\pi}\{e^{-j\omega\pi} - 1\} = \frac{3j}{2k\pi}\{\cos(k\pi) - 1\} = \frac{3j}{2k\pi}\{(-1)^k - 1\}$$

Q3. Medium-Easy

a. Many students have troubles on the calculation of integration of exponential function, particularly when absolute operator is involved. Most students cannot recognize that the key point is t=1. Typically, t=0 is selected and a few of them used t=-1 as the key point.
b. For (b), students are not able to derive the correct answers from the result of part (a). It seems that they cannot distinguish the magnitude and phase angle terms from their correct answer of (a).

Q4. Easy

a. Most students can obtain the X(jw) and H(jw) from x(t) and h(t), and the calculate Y(jw) accordingly. Most of students knew Y=XH, but a few of them still used X+H to calculate Y (but correct understanding to Y=XH).
b. If Y(jw) is derived correctly, most can get the correct magnitude and angle.
c. It seems some students run out of time.