

Vibration Analyst CAT III Practice

1. What would the effective bin width be for a spectrum using a 48,000 CPM Fmax, 1600 Lines of Resolution and a Hanning window?
 - A) 0.75 Hz
 - B) 3 Hz
 - C) 45 Hz
 - D) 0.5 Hz
2. If a PeakVue[®] spectrum for a 1200 RPM machine uses a Fmax of 40 orders, which filter should be used?
 - A) 1,000 Hz high pass filter
 - B) 5,000 Hz high pass filter
 - C) 1,000 Hz low pass filter
 - D) 5,000 Hz low pass filter
3. A SKF 6208-2Z ball bearing has 9 balls, a roller diameter of .48437 in, a pitch diameter of 2.3622 in., and a contact angle of 0°. Its calculated BPFO is 3.577 orders. What is its calculated BPF1 (in orders)?
 - A) 3.577
 - B) 5.423
 - C) 2.336
 - D) Not enough information given to calculate this frequency.
4. A gearbox has two shafts. The input pinion speed is 1180 RPM and has 27 teeth. The output bull gear has 53 teeth. What is the output shaft RPM?
 - A) 62,540 RPM
 - B) 601 RPM
 - C) 22.26 RPM
 - D) 2,316 RPM
5. Calculate the fan RPM for the following machine:
Motor sheave diameter = 16" Fan sheave diameter = 20" Belt length = 286"
Motor RPM = 3560
 - A) 4,450 RPM
 - B) 228.8 RPM
 - C) 12.5 Hz
 - D) 2,848 RPM
6. What would the pole pass frequency be for an AC Induction motor running at 878 RPM? (Assume a VFD is not being used.)
 - A) 176 Hz
 - B) 2.93 Hz
 - C) 22 Hz
 - D) 0.37 Hz

- 7. To prevent Aliasing, a low pass filter is applied to the waveform at which frequency?**
- A) At the same value as the F_{max}
 - B) At 2.56x the F_{max}
 - C) At 67% of the F_{max}
 - D) The Anti-Aliasing filter is a high pass filter.
- 8. During cross-channel testing, what would a coherence value of .25 indicate?**
- A) The amplitude of sensor "A" is the same as that of sensor "B".
 - B) The signal being measured by sensor "A" is the same as that being measured by sensor "B".
 - C) The phase of sensor "A" is the same as that of sensor "B".
 - D) Poor coherence – possibly invalid data
- 9. If the level of vibration at 1x RPM of a rotor is measured at .6 in/sec at 1800 CPM and that amplitude is totally due to imbalance, what would the amplitude of vibration at 1x RPM be if the speed were reduced to 900 RPM?**
- A) .15 in/sec
 - B) .3 in/sec
 - C) .244 in/sec
 - D) .4 in/sec
- 10. Two closely spaced vibration frequencies are causing a beat. One of the frequencies is 29.5 Hz. The other is 29.7 Hz. What is the period of the beat?**
- A) 59.2 seconds
 - B) 5 seconds
 - C) .2 Hz
 - D) 5 Hz
- 11. What would the sample rate be if the spectrum specified a F_{max} of 30,000 CPM and used 1600 lines of resolution?**
- A) 1280 Hz
 - B) 18.75 Hz
 - C) 4096 Hz
 - D) 76,800 Hz
- 12. If the spectrum uses an F_{max} of 1000 Hz and 1600 Lines of Resolution, what is the time waveform resolution?**
- A) .39 milliseconds
 - B) 0.625 seconds
 - C) .39 seconds
 - D) 1.6 seconds
- 13. How many data points are contained in a waveform when the corresponding spectrum has an F_{max} of 1000 Hz and uses 1600 Lines of Resolution?**
- A) 4096
 - B) 2048
 - C) 1024
 - D) 256

- 14. What is the recommended percentage of data overlap used for periodic vibration data collection?**
- A) 67%
 - B) 100%
 - C) 33%
 - D) 50%
- 15. A vibration occurs at a frequency of 1500 CPM. What is the period of this vibration?**
- A) .25 seconds
 - B) 25 Hz
 - C) .04 minutes
 - D) .04 seconds
- 16. What is the sample rate needed to accurately generate a spectrum with a Fmax of 60,000 CPM and 1600 LOR?**
- A) 4,096 Hz
 - B) 153,600 Hz
 - C) 2,560 Hz
 - D) 1,000 Hz
- 17. For a true sine wave, how could the Peak value be approximated from the RMS value?**
- A) By multiplying the RMS value by .707
 - B) By multiplying the RMS value by 2.56
 - C) By multiplying the RMS value by 1.414
 - D) By multiplying the RMS value by 60
- 18. The spectrum taken on an AC Induction motor turning 3585 RPM shows a peak at 2x turning speed. Using a Fmax of 1000 Hz along with a Hanning Window, what is the minimum number of lines that would allow the analyst to identify how much energy is electrical and how much energy is mechanical?**
- A) 1600 lines
 - B) 3200 lines
 - C) 6400 lines
 - D) 12,800 lines
- 19. How long (in seconds) will a waveform need to be to generate a frequency spectrum with an Fmax of 30,000 CPM using 1600 Lines of Resolution?**
- A) 0.156 sec
 - B) 0.1067 sec
 - C) 3.2 sec
 - D) 9.375 sec
- 20. Using 67% overlap, how long would it take to acquire data using an Fmax of 60,000 CPM, 1600 Lines, and 6 Averages?**
- A) 5.96 sec
 - B) 4.24 sec
 - C) 6.25 sec