EJEMPLOS DE PREGUNTAS DE EXAMEN DE CERTIFICACION PUBLICADOS POR EL VIBRATION INSTITUTE EN SU PAGINA WEB

SAMPLE QUESTIONS: CATEGORY I

1. What are the units of vibration velocity?

a. mils
b. g's
c. inches per second
d. inches
e. degrees

2. The period of vibration is typically measured in

a. days
b. hours
c. minutes
d. milliseconds
e. nanoseconds

3. A vibration transducer used to evaluate pump faults and condition should be mounted

a. anywhere
b. on the floor
c. close to the machine bearings
d. on the piping
e. close to the electrical supply box

4. In vibration work the fast Fourier transform is used to

a. obtain the amount of vibration at machine frequencies
b. transform machine vibration into heat
c. generate a vibration waveform
d. filter out unwanted noise from the data
e. transform machine vibration into noise

5. Baseline vibration measurements are made to

a. evaluate the initial condition of equipment
b. generate new design information
c. provide a basis for future comparisons of data
d. evaluate instruments used for monitoring
e. a and c

6. A gearbox is used in a machine train to

a. obtain operational efficiency
b. lower vibration levels
c. reduce heat
d. allow driven and driver to operate at different speeds
e. a and d

7. A 60 Hz two-pole induction motor operates

a. at 3,600 RPM under load
b. at a speed less than its magnetic frequency
c. with a load-related slip
d. at 7,200 RPM
e. b and c

8. The principal function of acceptance testing is to obtain:

a. equipment that meets a specification
b. the lowest prices
c. baseline data
d. a fault analysis
e. a condition evaluation

9. The vibration level on a fan increased from 0.1 inch per second to 1.0 inch per second over the period of a month. What is the possible cause of the increase in vibration?

a. loss of a blade
b. small rolling element bearing defect
c. change in the weather
d. change in operational conditions
e. a or d

10. Operation of a machine at its critical speed

a. may cause decreased vibration levels
b. may not change the vibration levels
c. may increase vibration levels
d. will increase its efficiency
e. a or b

answers to sample questions for Category I: 1. c, 2. d, 3. c, 4. a, 5. e, 6. e, 7. e, 8. a, 9. a, 10. C

IMPORTANT

You must bring a pen and a **SCIENTIFIC** calculator to the examinations for all categories. Any additional materials necessary for the examinations are provided. All calculations are to be done on the examination.

SAMPLE QUESTIONS: CATEGORY II

1. What is the fundamental frequency of the waveform shown in Figure 1?

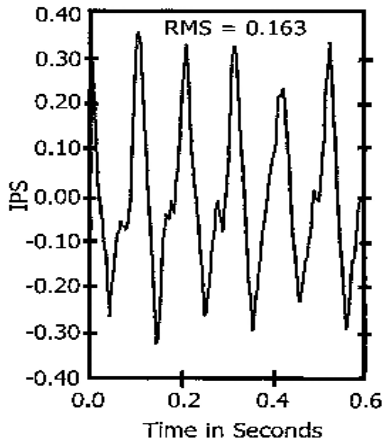

Fig. 1

a. 5.3 Hz
b. 11.59 Hz Figure 1
c. 22.8 Hz
d. 60 CPM
e. 1,365 CPM

2. What measure has been shown to be most effective for evaluation of general machine condition from bearing cap measurements?

a. displacement
b. acceleration
c. mils
d. velocity
e. g's

3. What is the most basic display that can be used to directly determine the phase relationship between the vibrations measured at two locations on a machine?

a. amplitude vs frequency
b. polar plot
c. Bodé plot
d. time waveform
e. cascade plot

4. What is the peak amplitude of the waveform shown in Figure 1?

a. 0.23 IPS
b. 0.70 IPS
c. 0.12 g's
d. 0.163 IPS
e. 0.350 IPS

5. The data shown in Figure 2 were taken off the inboard bearing of a two-pole motor in the horizontal direction. The spectrum of the axial vibration contains a component at 3,580 CPM equal to 0.2 in./sec.

What is the most likely fault?

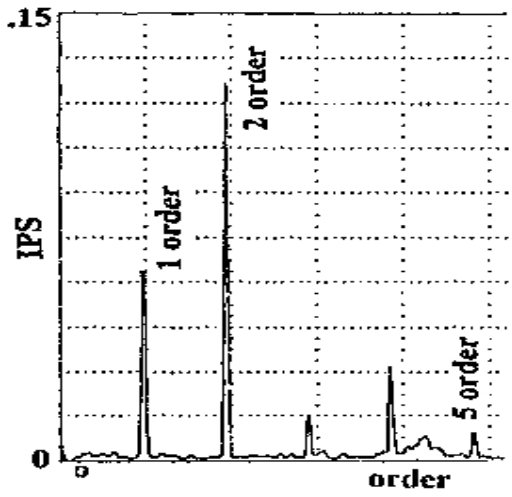

Fig. 2

a. mass unbalance
b. misalignment
c. air-gap variation
d. looseness
e. rub Figure 2

6. The frequency span used for fault analysis on an FFT analyzer is concerned with

a. dynamic range
b. phase distortion
c. resolution
d. amplitude
e. none of the above

7. Vibration from rotor mass unbalance appears in the spectrum at a frequency of

a. 3 times operating speed
b. 4.5 times operating speed
c. one times operating speed
d. none of the above

8. Calculate the gear-mesh frequency for a gear set with 28 pinion teeth and 99 gear teeth. The pinion operates at 1,776 RPM.

a. 500 H
b. 30,000 CPM
c. 49,728 CPM
d. 175,824 CPM
e. 29.6 Hz

9. An accelerometer was used to measure 2 g's peak at 565 Hz. What was the peak vibration velocity?

a. 0.2 mil
b. 2 mils
c. 0.02 inch/second
d. 0.11 inch/second
e. 0.22 inch/second

10. The first alarm or alert is set on a data collector to initiate

a. a fault analysis
b. a time-to-failure calculation
c. an increase in the alarm setting
d. a reduction in the alarm setting
e. machine shutdown

answers to sample questions for Category II: 1. b, 2. d, 3. d, 4. e, 5. b, 6. c, 7. c, 8. c, 9. e, 10. a

SAMPLE QUESTIONS: CATEGORY III

1. The data shown in Figure 1 were acquired from a vertical pump bearing in the horizontal direction with an accelerometer integratedto velocity - 1,000 mv/in./sec. What isthe peak vibration in in./sec?

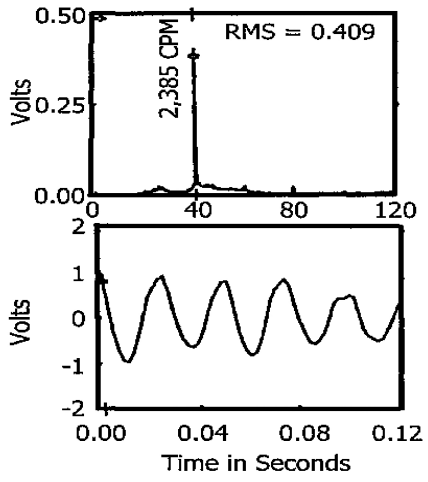

Fig. 1

a. 0.110
b. 0.398

c. 0.578
d. 1.0
e. 2.0

2. Spectrum analysis of a motor-driven gearbox with sleeve bearings, an input speed of 3,585 RPM, and a pinion containing 73 teeth would require which of the following transducer mounting techniques?

a. hand held
b. magnet
c. wax
d. stud Figure 1

3. A 1,785 RPM-200 HP motor drives a hammer mill through a fluid coupling at 1,720 RPM. If a maximum number of 800 lines of resolution are available on an FFT spectrum analyzer and a Hanning window is used,what is the maximum frequency span that will permit resolution of the operating speed components of the motor and hammer mill?

a. 300,000 CPM
b. 120,000 CPM
c. 60,000 CPM
d. 17,333 CPM

4. A polar plot typically contains data from a permanently-mounted proximity probe. What information is obtained from the polar plot on start-up?

a. bearing stiffness
b. critical speeds
c. rotor mass
d. oil viscosity

5. Frequencies of operating speed, gear mesh, and bearing faults are called

a. natural frequencies
b. critical speeds
c. damping values
d. forcing frequencies
e. a and c

6. The vibration data shown in Figure 2 were taken from the pedestal of an 18-inch guide roll with a surface speed of 2,473 ft/min. The roll is supported on rolling element bearings with the following defect frequencies: BPFO, 5.24 x RPM;BPFI 7.57 x RPM; BSF,2.41 x RPM; FTF, 0.4 x RPM. What is the vibration source?

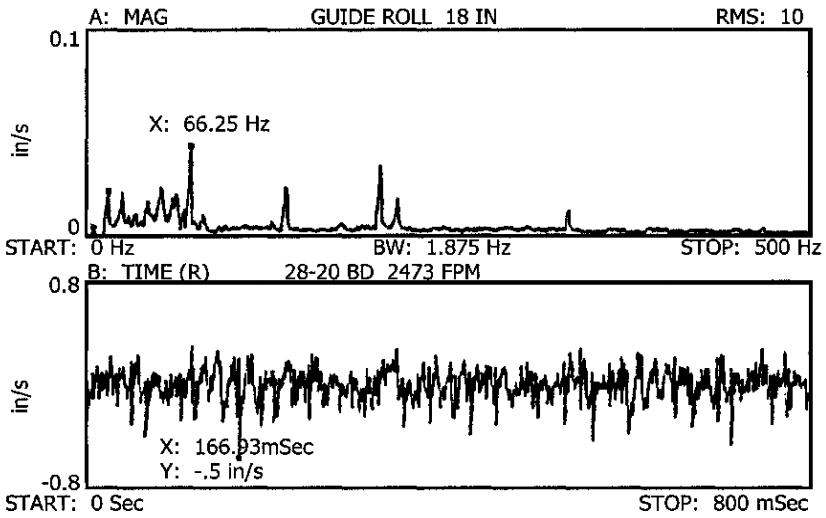

Fig. 2

a. pedestal looseness
b. mass unbalance
c. bearings defect(s) on outer race
d. resonance
e. bearing defect(s) on inner race

7. What is the likely cause of the excessive vibration measured on the vertical pump from Figure 1? An impact test showed astructural natural frequency at 39.5 Hz. Figure 2

a. mass unbalance
b. resonance
c. misalignment
d. cavitation
e. looseness

8. Vibration measured on a two-pole motor in the horizontal direction shows 0.1 IPS and 0.02 IPS at 1x and 2x operating speed respectively. At. 7,200 CPM the motor has a component of 0.25 IPS in the same spectrum. What is the major source of the excessive vibration?

a. mass unbalance
b. misalignment
c. looseness
d. casing distortion
e. rubs

9. A spectrum containing data from a single-reduction gearbox includes vibration activity at gear speed (0.05 IPS at 59.5 Hz) and gear mesh frequencies (0.5 IPS at 5,950.0 Hz). What is the dynamic range of the analyzer required if the data are to be shown in an acceleration spectrum?

a. 6 dB
b. 12 dB
c. 40 dB
d. 60 dB
e. 64 dB

10. A blower operating at 1,785 RPM has a large component of vibration (0.35 in./sec) at operating speed. An impact test shows a structural natural frequency of the support frame at 1,800 CPM. What would be the best corrective action to reduce the blower vibration?

a. balance the blower
b. stiffen the support frame
c. reduce the stiffness of the support frame
d. align the blower to the motor

answers to sample questions for Category III: 1. d, 2. d, 3. d, 4. b, 5. d, 6. e, 7. b, 8. d, 9. d, 10. b