

ITL 702 Diagnostic Maintenance & Condition Monitoring

Major Exam

Attempt All Questions

Max Marks: 30

1. Answer the following very briefly.
 - i) Do you recommend use of A-weighting network in noise monitoring of rotating machines for fault detection? Why? (2)
 - ii) What is percentage overlap in FFT analysis? Why is it used? (2)
 - iii) What is the main advantage of using Cepstrum analysis in gear fault detection? (1)
 - iv) Which acoustic emission measurement parameters are independent of threshold setting? (1)
 - v) Which non-destructive testing (NDT) technique requires access to both sides of the test piece? (1)

2.
 - i) An industrial fan of 6 feet height mounted on a 10 feet high concrete pedestal produces high vibration and noise. Neighbouring machines are smaller generating much less noise and vibration. Out of vibration and noise monitoring, which one will be preferred for monitoring the condition of its blades? What will be the methodology for blade fault detection? (2)

 - ii) Why is charge amplifier used with accelerometer in vibration measurements? What are the differences between accelerometers and acoustic emission transducers? (3)

3.
 - i) An acoustic emission source is present between transducer no. 1 and 2 mounted on a long beam. Transducer no. 2 gets higher peak amplitude. The distance between the transducers is 750 mm and the difference in wave arrival time at the transducers is 250 microseconds. Calculate the exact location of source from transducer no. 2 taking wave velocity as 3 km/s. (2)

 - ii) Which frequencies will appear in the vibration spectrum of an induction motor due to broken rotor bar when the rotational speed is 1440 rpm, slip is 10% and supply frequency is 49 Hz? (3)

4. Which vibrations measurement system can be used for measuring vibrations from a 2-meter distance? Explain the method in detail. (6)

5. Explain magnetic plugs and chip detectors used for wear debris analysis in oil. Name one industrial application of magnetic plugs. (4)

6. Why do undamaged new rolling element bearings generate shock pulses? What is the resonant frequency of shock pulse meter transducer and what is the basis of choosing that? (3)