

المرحلة الثالثة - قسم الإنتاج  
صيانة محطات

Menoufiya University  
Faculty of Engineering  
Shebin El-Kom  
Final Examination  
Academic Year:2014-2015



Dep.of Production Eng.&Mech.Design  
Year: 3<sup>rd</sup>  
Subject/Code: Maintance324  
Time: 3Hours  
Date: 2-6-2015 Total Marks:60

Allowed Table (None)

This exam measures ILOS no:(a<sub>1</sub>,a<sub>5</sub>,a<sub>6</sub>,a<sub>19</sub>b<sub>2</sub>,b<sub>6</sub>,b<sub>9</sub>,c<sub>5</sub>,c<sub>6</sub>,c<sub>18</sub>,d<sub>1</sub>)

Answer all the following Questions

Question(1)

( 12marks )

- What is the global aim of machine health monitoring?
- Prepare special report and analysis for balancing program for fan with 6 blades with the following position (0°,60°,120°,180°,240°,300°)

When the following measurements were made during balance job:

Initial condition  $V_0=20\text{mm/sec}$ ,  $\Phi_0=190^\circ$ ,  $V_1=25\text{mm/sec}$ ,  $\Phi_1=290^\circ$  and trial mass=4gram, the total weight of rotating parts=5kg. Diameter of fan=20mm.

Question(2)

( 18marks )

Give short account using sketch:

- Bearing inspection using vibration analysis
- Coherence measurements
- Trouble shoot chart give examples
- Nyquist diagram
- Preventive maintenance and run to break down
- On condition maintenance

1) Explain with sketch and examples:-

- Balancing quality chart.
- Overall level.
- Technique of vibration analysis is suitable for what types of maintenance.
- Monitoring and Diagnosis in block diagram.
- The important factors affecting vibration Isolation.
- The benefits of frequency analysis.

Question(3)

(6marks)

Choose The correct answer:

- When sub- harmonic of shaft multiples of 1/2 or 1/3 rpm exactly (Oil whirl-Rotate stall-Internal assembly looseness in bearing)
- For a machine running at 9 Hz which parameter is not suitable for measuring vibrations( Displacement- Velocity -Acceleration-Phase)

3-The maintenance philosophy of operating the machine until it fails is called Break down maintenance- proactive maintenance –predictive maintenance- preventive maintenance)

4-Crest factor of wave form is a ratio (peak to rms- rms to Peak-Peak to mean – Peak to 1.414 time rms)

5-Global damage detection in large structure can be known using (CT Scanning Ultrasonic - Change dynamic characteristics. )

6-Ultrasound have frequency level above (20Hz-20kHz-100kHz-100Hz)

**Question(4) (12 marks)**

Explain this expression with the aid of vibration analysis technique

The issue of robust design analysis is finding a representation away to convert raw data to features.

**Question(5)**

(12marks)

Fig is atypical analysis data resulting from measuring vibration amplitude on bearing (B) in three directions

Discuss what is the vibration due to (permissible amplitude of vibration equal 4 mm/sec. but in horizontal plane it reaches to 6 mm/sec)

