

POSTAL Book Package

2021

Mechanical Engineering

Objective Practice Sets

Production and Maintenance Engineering

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Maintenance Engineering

Q.1 Which of the following are the basic differences between vibration signature and noise signature?

1. Vibration signature is essentially in the frequency range zero to 100 cps whereas noise signature is in the range 20 cps to 3000 cps.
2. Vibration signature has well-defined peaks whereas the noise signal is measured.
3. The intensities of noise signatures are much less than that of vibration signatures.
4. Detection of vibration signature calls for a microphone whereas that of noise can do with a pickup.

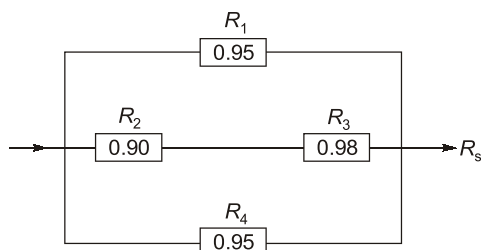
Select the correct answer using the code given below.

- (a) 1 and 4 (b) 2 and 3
(c) 1 and 2 (d) 3 and 4

Q.2 An engine is to be designed to have a minimum reliability of 0.8 and minimum availability of 0.98 over a period of 2×10^3 hr. The MTTR is nearly

- (a) 168 hr (b) 174 hr
(c) 183 hr (d) 188 hr

Q.3 A new cellphone design that is more reliable because of its parallel circuits as shown below. The percentage probability of failure of this cellphone is



- (a) 0.00295 (b) 0.295
(c) 0.295×10^{-3} (d) 0.0295

Q.4 Consider the following statements about Non-destructive testing:

1. The ultrasonic inspection method has high penetrating power and sensitivity.

2. Magnetic particle inspection method can be used to detect surface defects for ferromagnetic materials only.
3. Eddy current method is a bit-slower method.
4. Liquid penetrant method is limited to surface.

Which of the above statements are correct?

- (a) 1, 2 and 3 (b) 2, 3 and 4
(c) 1, 2 and 4 (d) all of the above

Q.5 Which of the following is not the characteristics of Eddy current NDT method?

- (a) Non-contact type
(b) Large depth of penetration
(c) Only good for conductive materials
(d) None of these

Q.6 Which of the following is not the technique of condition monitoring?

- (a) Corrosion monitoring
(b) Visual inspection
(c) Layout monitoring
(d) Performance monitoring

Q.7 Which of the following are classifiable as non-destructive testing methods ?

1. Scleroscope test
2. Liquid penetrant method
3. Magnetic particle inspection
4. Schmidt Hammer test

Select the correct answer using the codes given below:

- (a) 1, 2 and 3 (b) 1, 2 and 4
(c) 3 and 4 (d) 1, 2, 3 and 4

Q.8 The reliability of a cutting assembly is as given below:

$$R(t) = \begin{cases} 1 - \left(\frac{t}{10}\right)^2, & 0 \leq t \leq 10 \text{ sec} \\ 1 - \frac{t^2}{1250}, & 10 \text{ sec} \leq t \leq 20 \text{ sec} \\ 0, & t > 20 \text{ sec} \end{cases}$$

What will be the mean time to failure?

- (a) 15.2 sec (b) 14.8 sec
(c) 25 sec (d) 22 sec

Q.9 The system is composed of 50 components connected in series. Each component has an exponential time with a constant failure of 0.01 per four thousand hours. What is the reliability of the system for 2000 hours and find MTTF?

Choose correct option.

- (a) 0.082; 800 hrs (b) 0.0778; 8000 hrs
(c) 0.778; 8000 hrs (d) 0.778; 800 hrs

Q.10 Consider the statement w.r.t. (RCM) Reliability centred maintenance:

- Step by step instructional tool for selecting applicable and appropriate maintenance.
- It helps to explain the matter in detailed fashion while teaching basic of reliability to people.
- It helps in designing, selecting and installing new system in a plant.
- All possible failures and their effect on target products or system are systematically analyzed.

Which of the above is correct regarding RCM?

- (a) 1, 2, 3 only (b) 2, 3, 4 only
(c) 1, 3, 4 only (d) 1, 2, 3, 4

Q.11 Match the following types of availability:

List-I

- A.** Inherent availability
B. Achieved availability
C. Operational availability

List-II

- $\frac{MTBM}{MTBM+M}$
- $\frac{MTBM}{MTBM+MTTR}$
- $\frac{MTBM}{MTBM+MDT}$

Codes:

- | | A | B | C |
|-----|---|---|---|
| (a) | 1 | 3 | 2 |
| (b) | 2 | 1 | 3 |
| (c) | 1 | 2 | 3 |
| (d) | 3 | 2 | 1 |

Q.12 If $R = \frac{\text{Mean fluid thickness}}{\text{Surface roughness (CLA)}}$ and based on

the value of 'R' method of lubrication is chosen where,

- $R < 1$ - Boundary lubrication
- $1 \leq R < 5$ - Fluid film lubrication
- $5 \leq R \leq 100$ - Mixed lubrication

Which of the following is correct for method of lubrication?

- (a) only 1 (b) 1, 2
(c) 1, 2, 3 (d) 1, 3

Q.13 Which of the following is correctly matched about 5's japanese principle?

- SEIRI - Sort out
- SEITON - Cleaning
- SEISO - Organise
- SHIKETSU - Standardization
- SHITSUKE - Self discipline

- (a) 1, 2, 4 (b) 1, 2, 4, 5
(c) 1, 4, 5 (d) 1, 2, 3, 4, 5

Q.14 Consider the following statement regarding pillars of (TPM) Total productive maintenance:

- JISHU HUZEN - uninterrupted operation, flexible operators and eliminating defects.
- KOBISTU KAIZEN - focussed improvement
- Safety, health and environment - zero accident, zero fires and zero health damage

Which of the above is correct w.r.t TPM pillars?

- (a) 1, 2, 3 (b) 1, 2 only
(c) 1 only (d) 2, 3 only

Q.15 Consider the statement w.r.t methods for condition monitoring:

- Split energy and Kutosis method is used for vibration monitoring.
- Magnetic plugs method used for lubrication analysis.
- Electric resistance and weight loss coupons method used for crack monitoring.
- Polarization resistance and magnetic plug method used for corrosion monitoring.

Which of the condition monitoring method is correct?

- (a) 1, 2, 4 (b) 1, 2
(c) 1, 2, 3 (d) 1, 2, 3, 4

19. (a)

Condition monitoring can be described as 'assessing the current state and estimating the future state of a system by means of measurements and calculations'. The results of condition monitoring can be used to take corrective actions, to plan the availability and maintenance, and to optimize the plant's performance. The main reasons to apply condition monitoring are:

- Prevention of damage.
- Increasing availability.
- Increasing reliability.
- Increasing time between outages (TBO).
- Changing from periodic maintenance to condition dependent maintenance.
- Fuel savings, by optimizing the process continuously.
- Reduction of production loss.
- Better operator process knowledge through more information and insight.

21. (a)

By obstructing the flow, there would occur pressure drops which can be measured using manometer and thus discharge through the pipe can be determined.

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