Anti-Friction Bearing Fundamentals Course Quiz

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CHAPTER 1 - INTRODUCTION

QUESTION 1

Select the true statement:

a) Leonardo da Vinci invented the first practical caged roller bearing.
b) Bearings date back to the age of antiquity and have existed in various forms over the past several thousand years.
c) The earliest recorded plain bearing design originates from the middle ages.
a) The 17th century saw a massive increase in the design and application of bearings.

QUESTION 2

There are two main categories of bearing, plain and anti-friction (rolling).

b) True
c) False

QUESTION 3

Who patented the first modern ball bearing design in 1794?

a) John Harrison.
b) Leonardo da Vinci.
c) Philip Vaughan.

CHAPTER 2 - BEARING FUNCTIONS

QUESTION 4

What are the main functions of bearings? There may be more than one correct answer.

a) Reduce Friction
b) Increase Friction
c) Improve Flexibility
d) Carry Load
e) Guide Parts

QUESTION 5

Plain bearings operate on the principle of sliding friction whilst rolling (anti-friction) bearings operate on the principle of rolling friction. What is the co-efficient of friction associated with rolling bearings?

a) Usually lower than that of plain bearings.
b) Usually higher than that of plain bearings.
c) The same as that of plain bearings.

QUESTION 6

Which form of friction occurs between two (or more) solid bodies that are not moving relative to each other?

a) Static friction.
b) Sliding friction.
c) Rolling friction.

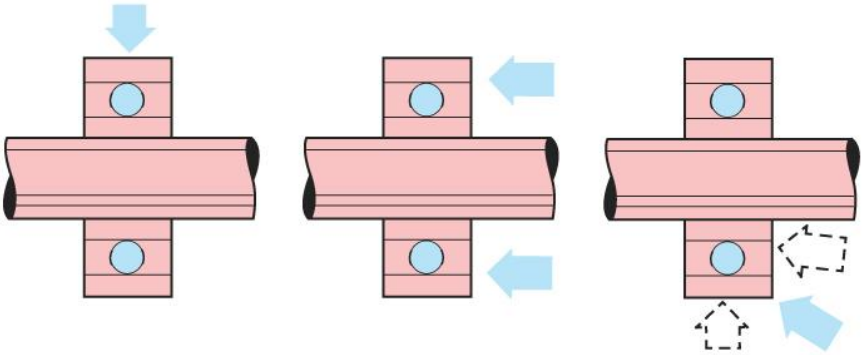
QUESTION 7

What principle of friction do anti-friction bearings operate with?

a) Static friction.
b) Sliding friction.
c) Rolling friction.

QUESTION 8

What are combination loads?



a) Loads which are a combination of both axial and radial loads; sometimes referred to as angular loads.
b) Loads which are applied perpendicular (90 degrees) to the shaft.
c) Loads which are applied parallel to the shaft.

QUESTION 9

What loads are applied perpendicular (90 degrees) to the shaft?

a) Axial loads.
b) Radial loads.
c) Combination loads.

QUESTION 10

A bearing by nature guides parts because it confines unwanted motion and allows desirable motion.

a) True
b) False

CHAPTER 3 - BEARING LUBRICATION

QUESTION 11

Which lubricants are by far the most popular because of their cheapness and versatility?

a) Synthetic lubricants.
b) Mineral oil-based lubricants.
c) Animal fat-based lubricants.
d) Plant/vegetable oils.

QUESTION 12

Which lubricants are biodegradable?

a) Synthetic lubricants.
b) Mineral oil-based lubricants.
c) Plant/vegetable oils.

CHAPTER 4 - COMPONENTS

QUESTION 13

What is a 'cage' also known as …

a) Retainer, separator.
b) Babbitt bearing, sliding bearing.
c) Ring.
d) Cone, cup.

QUESTION 14

Which of the given statements are true regarding anti-friction bearing components? There may be more than one correct answer.

a) Anti-friction bearings are also known as rolling bearings, rolling contact bearings and rolling element bearings.
b) Anti-friction bearings are colloquially called babbitt, hydrostatic, hydrodynamic, and white metal bearings.
c) Anti-friction rolling elements are of only one type – ball bearings.
d) Rolling elements of anti-friction bearings are usually held between bearing races.
e) A cage spaces the rolling elements of anti-friction bearings apart.
f) The outer ring usually rotates with the shaft.

CHAPTER 5 - TERMINOLOGY

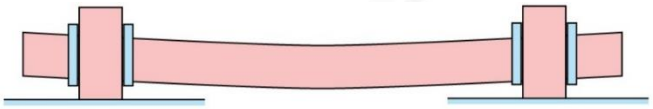
QUESTION 15

What type of misalignment is shown in the picture?

a) Static.
b) Dynamic.

QUESTION 16

Which type of misalignment happens due to operating conditions?



a) Static.
b) Dynamic.

QUESTION 17

What type of anti-friction bearing is shown in the picture?

a) Single row anti-friction bearing
b) Double row anti-friction bearing

QUESTION 18

Why are double row bearings often employed?

a) To handle loads acting in opposing directions.
b) To increase the load contact surface area.
c) To increase the overall load carrying ability of the bearing.
d) All given statements.

QUESTION 19

What bearing design is referred to as a 'full complement' bearing?

a) Without a cage.
b) With outer ring.
c) Without a cone.

QUESTION 20

What is true about full complement bearings?

a) They can carry higher loads due to the narrow load carrying contact area.
b) They can carry higher loads due to the larger load carrying contact area.
c) They can only be used for high-speed applications.

QUESTION 21

What is true about floating bearings? There may be more than one correct answer.

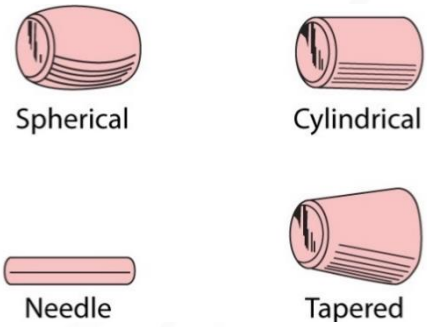
a) They allow for some form of axial movement.
b) They do not allow for axial movement.
c) Most installations use a single fixed bearing and one or more floating bearings.
d) Floating bearings are commonly installed with self-aligning bearings.

CHAPTER 6 - ANTI-FRICTION BEARING TYPES

QUESTION 22

Ball bearings use non-sphere-shaped rolling elements whilst roller bearings use sphere shaped rolling elements.

a) True
b) False



QUESTION 23

What bearing design is capable of handling higher loads, but generates more friction and consequently operates at lower speeds?

a) Bearings that rotate about a point.
b) Bearings that rotate about a line.

QUESTION 24

What bearing design generates a low amount of friction and is suitable for moderate to high-speed applications?

a) Bearings that rotate about a point.
b) Bearings that rotate about a line.

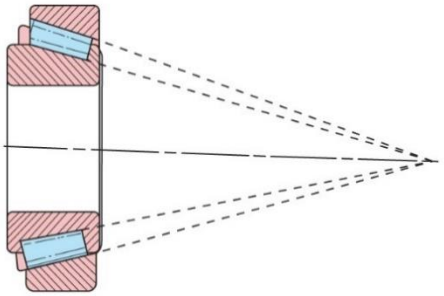
QUESTION 25

What bearing design operates upon the principle of point contact?

a) Ball bearing.
b) Roller bearing.

QUESTION 26

What statement is true regarding tapered roller bearings?



a) They have races and rolling elements that slant inwards towards a central point along the bearing axis.
b) They have races and rolling elements that align parallel with the bearing axis.

QUESTION 27

Which of the following statements concerning anti-friction bearings is false?

a) Bearings with a shield or seal have a different appearance to open bearings because the rolling elements of the bearing cannot be seen.
b) Anti-friction bearings may be open, shielded or sealed.
c) A bearing without either a shield or seal is an open bearing.
d) Shielded and sealed bearings must be lubricated periodically whilst in service.

QUESTION 28

What may press against one ring (non-contact), or both rings (contact)?

a) A seal.
b) A shield.
c) Both seals and shields.

QUESTION 29

What prevents foreign particle ingress and is attached to the stationary race only?

a) Seal.
b) Shield.
c) Both.

QUESTION 30

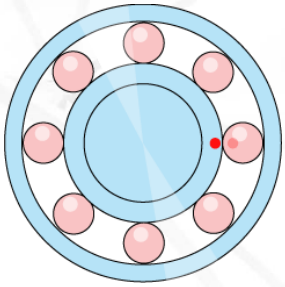
What prevents lubricant from exiting the bearing whilst also preventing moisture and foreign particle ingress?

a) Seal.
b) Shield
c) Both.

CHAPTER 7 - BALL BEARINGS

QUESTION 31

Which bearing design is incredibly versatile, can be used for medium high radial loads, and light-medium thrust loads, in either direction?



a) Single row ball bearings.
b) Double row ball bearings.
c) Thrust ball bearings.
d) Shallow groove ball bearings.

QUESTION 32

What bearings are known as *Conrad* bearings?

a) Single row ball bearings.
b) Shallow groove ball bearings.
c) Thrust ball bearings.
d) Deep groove single row ball bearings.

QUESTION 33

Which of the given statements is true regarding double row ball bearings?

a) They can carry less radial load than their single row counterparts.
b) This type of bearing can support heavy radial loads and low-medium axial loads, in either direction.
c) They are designed to accommodate axial loads only and cannot support radial loads.
d) This type of bearing handles thrust in one direction only.

QUESTION 34

Deep groove ball bearings can carry higher radial and axial loads than shallow groove ball bearings.

a) True
b) False

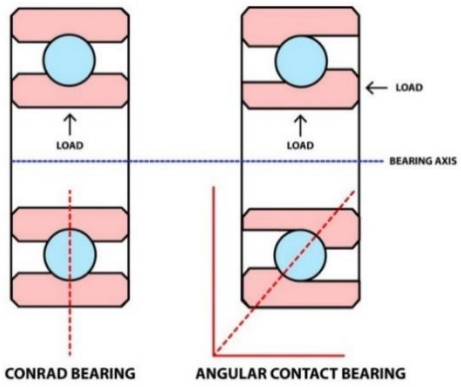
QUESTION 35

Which ball bearing design cannot support radial loads?

a) Thrust ball bearing.
b) Angular contact ball bearing.
c) Single row ball bearing.
d) Shallow groove ball bearing.

QUESTION 36

Anti-friction ball bearings can be used to accommodate radial loads and high thrust loads. What design is used when this occurs?



a) Thrust ball bearing.
b) Angular contact ball bearing.
c) Deep groove ball bearing.
d) Single row ball bearing.

CHAPTER 8 - ROLLER BEARINGS

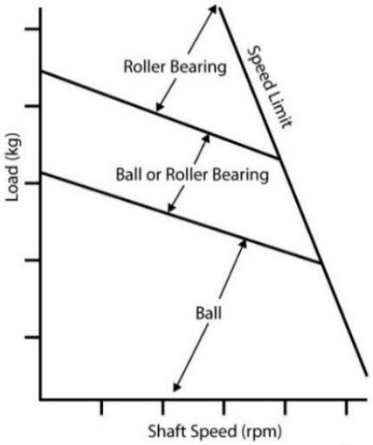
QUESTION 37

How many types of roller bearing design are there?

a) Two.
b) Three.
c) Four.
d) Five.

QUESTION 38

Which of the following statements are true concerning roller bearings? There may be more than one correct answer.



a) They can carry lower radial loads than ball bearings.
b) They operate using line contact.
c) They are well suited to handle axial loads.
d) They have higher coefficients of friction.
e) They are not suitable for very high-speed applications.

QUESTION 39

Cylindrical roller bearings may consist of an outer ring, inner ring, cage, and rollers, or combination of these parts.

a) True.
b) False.

QUESTION 40

Which roller bearing design is suitable for handling axial loads? There may be more than one correct answer.

a) Tapered roller bearing.
b) Cylindrical roller bearing.
c) Spherical roller bearing.
d) Needle roller bearing.

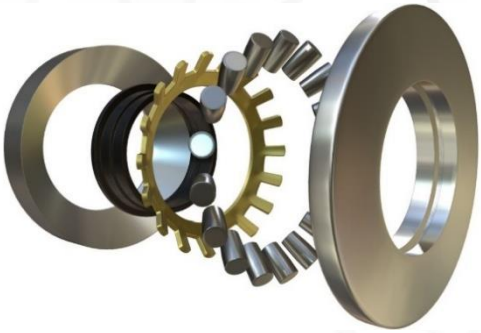
QUESTION 41

Which bearing design is used extensively in the automotive industry?

a) Tapered roller bearing.
b) Cylindrical roller bearing.
c) Spherical roller bearing.
d) Needle roller bearing.

QUESTION 42

Identify the bearing design shown in the image.



a) Cylindrical roller bearing.
b) Needle roller bearing.
c) Spherical roller bearing.
d) Tapered roller bearing.

QUESTION 43

Which bearing design has barrel shaped rolling elements?

a) Cylindrical roller bearing.
b) Needle roller bearing.
c) Spherical roller bearing.
d) Tapered roller bearing.

QUESTION 44

Spherical roller bearings can handle misalignment much better than other roller bearings and are the bearing of choice if misalignment is expected (usually dynamic misalignment).

a) True.
b) False.

QUESTION 45

Select the true statement.

a) With needle roller bearings, the rolling elements have a longer length to diameter ratio (typically 4:1 or more).
b) With cylindrical roller bearings, the rolling elements have a longer length to diameter ratio (typically 4:1 or more).
c) With needle roller bearings, the rolling elements have a shorter length to diameter ratio (typically 2:1 or more).
d) With cylindrical roller bearings, the rolling elements have a longer length to diameter ratio (typically 3:1 or more).

QUESTION 46

Concerning needle roller bearings, select all true statements. There may be more than one correct answer.

a) They can carry high radial loads.
b) The rolling elements have a large contact surface area.
c) They are designed to carry axial loads.
d) They are designed to operate at very high speeds.

QUESTION 47

What bearing design has no cage and is used for slow speed, high load applications?

a) Cylindrical roller bearing.
b) Tapered roller bearing.
c) Ball bearing.
d) Full complement needle roller bearing.

QUESTION 48

All needle bearings are equipped with an inner race.

a) True.
b) False.

CHAPTER 9 - BEARING COMPARISON

QUESTION 49

Which roller bearing designs can operate at low to moderate speeds?

a) Cylindrical roller bearings.
b) Needle roller bearings.
c) Spherical roller bearings.
d) Tapered roller bearings.
e) All roller bearings.

QUESTION 50

Which roller bearing design is ideal for applications where misalignment may occur?

a) Cylindrical roller bearing.
b) Needle roller bearing.
c) Spherical roller bearing.
d) Tapered roller bearing.

ANSWERS

1. b
2. a
3. c
4. a/d/e
5. a
6. a
7. c
8. a
9. b
10. a
11. b
12. c
13. a
14. a/d/e
15. a
16. b
17. b
18. d
19. a
20. b
21. a/c/d
22. b
23. b
24. a
25. a
26. a
27. d
28. a
29. b
30. a
31. a
32. d
33. b
34. a
35. a
36. b
37. c
38. b/d/e
39. a
40. a/c
41. a
42. d
43. c
44. a
45. a
46. a/b
47. d
48. b
49. e
50. c