

**Multiple Choice Questions with Answers**

Choose the correct answer: -

1. The following is (are) the example(s) of static friction
  - A. Shoe brake applied to a vehicle.
  - B. Shoe brake applied to a train.
  - C. Dry grinding stone abrades the surface of metal.
  - D. All of the aboveAnswer (D)
2. As per laws of dry friction, the frictional force
  - A. depends upon the nature of sliding surface.
  - B. is dependent of the sliding velocity.
  - C. is directly proportional to the load.
  - D. All of the above.Answer (D)
3. The following lubricants are obtained by fractional distillation of petroleum
  - A. Mineral oils.
  - B. Fatty oils.
  - C. Solid lubricants
  - D. All of the above.Answer (A)
4. For low pressure and low speeds, we use
  - A. Mineral oils.
  - B. Semi-solid lubricants.
  - C. Solid lubricants.
  - D. All of the above.Answer (C)
5. Lubrication oil from automobile machines come under ----- oil.
  - A. Clean
  - B. Less dirty
  - C. More dirty
  - D. Highly dirtyAnswer (D)
6. In which period, was the word *Tribology* coined after realizing significant losses due to lack of knowledge of friction and wear and a need for an interdisciplinary approach was considered?
  - A. 1960
  - B. 1966
  - C. 1964
  - D. 1970Answer (B)
7. Out of the following disciplines, which one is not considered for an interdisciplinary approach in tribology?
  - A. Solid and fluid mechanics
  - B. Material science
  - C. Machine design
  - D. Industrial engineeringAnswer (D)
8. The meaning of the Greek word "Tribos" from which the word Tribology is formed
  - A. Rubbing
  - B. Movement

- C. Fluid  
D. Heat
- Answer (A)
9. Which one of the following is NOT the purpose of Tribology?  
A. Improve surface life  
B. Increase safety and reliability  
C. Reduce fatigue  
D. Increase heat generation
- Answer (D)
10. Asperities are basically:  
A. Sharp tips on surface.  
B. Edge of a surface.  
C. Corner of a surface.  
D. Hole in surface.
- Answer (A)
11. Which one is NOT a standard method for quantifying surface roughness?  
A. Root mean square roughness.  
B. Average roughness.  
C. Flatness of tolerance (GD&T).  
D. Rating method on arbitrary scale.
- Answer (D)
12. Which one of the following statement is true?  
A. Wear rate increases with increasing load.  
B. Wear rate decreases with increasing temperature.  
C. Wear rate decreases with increasing speed.  
D. Wear rate is independent of load / temperature.
- Answer (A)
13. The purpose of lubricant filter system is  
A. To remove the debris from the lubricant  
B. To enhance the viscosity of the lubricant  
C. Reduce the temperature of the lubricant  
D. Reduce the quantity of the lubricant
- Answer (A)
14. Which one of the following parameters is not included by *Stribeck Curve*?  
A. Viscosity of the lubricant.  
B. Speed of the surface  
C. Load at the interface.  
D. Surface roughness
- Answer (D)
15. Which one of the following statement is NOT true about friction?  
A. Friction is tangential resistance to motion  
B. Friction is dependent upon the surface of the contact  
C. Friction is greater on rough surface  
D. Friction does not decrease with lubrication
- Answer (D)
16. Coefficient of friction is independent of  
A. Temperature  
B. Surface roughness  
C. Hardness  
D. Surface area of contact
- Answer (D)
17. Adhesion component of dry friction is negligible at interface of  
A. High temperature surfaces.  
B. Lubricated tribo pair.  
C. Rough surfaces.

- D. Extra smooth surfaces. Answer (B)
18. Cold weld between two surfaces happens because of:  
A. Excessive lubrication.  
B. Adhesion between two surfaces.  
C. Relatively high surface roughness.  
D. Low temperature on contact area. Answer (B)
19. As per the ploughing theory of friction, which of the following statements is NOT true?  
A. Slope of asperities govern the friction force.  
B. Sharp asperities cause more friction compared to round or spherical asperities.  
C. Asperities on one surface interact with the asperities or valleys on the other surface.  
D. An asperity of softer surface causes ploughing on the harder surface. Answer(D)
20. The formation of Junction growth can be reduced by  
A. Lubricating of the surfaces.  
B. Increasing the surface finish of the rubbing surfaces.  
C. Annealing the surfaces.  
D. All of the above. Answer (A)
21. Deformation of asperities causes  
A. Increase in friction.  
B. Decrease in friction.  
C. Can increase or decrease friction.  
D. No effect. Answer (C)
22. Ploughing effect causes  
A. Piercing and penetration of the soft surface by the asperities of the harder surface.  
B. Increase in friction.  
C. Both (a) and (b).  
D. None of these Answer (C)
23. Coefficient of friction due to rolling is generally  
A. Greater than coefficient of sliding friction.  
B. Lesser than coefficient of sliding friction.  
C. Equal to sliding friction.  
D. May be greater or smaller compared to sliding friction. Answer (B)
24. Which of the following are the major contributors to rolling friction  
A. Micro-slip effect with the contact area.  
B. Elastic-hysteresis of the contacting materials.  
C. Plastic deformation of the materials and adhesion effects in contact.  
D. All of the above. Answer (D)
25. Zero wear increases performance because  
A. It causes polishing of surface.  
B. Size of surface asperities increases.  
C. It removes lubrication from the surface.  
D. It increases load bearing capacity of the surface. Answer (A)
26. Which among the following is not an adhesive wear mechanism?  
A. Galling.  
B. Scoring.  
C. Scuffing.  
D. Polishing. Answer (D)

27. Scratching is a form of  
A. Abrasive wear  
B. Adhesive wear  
C. Corrosive wear  
D. Fatigue wear  
Answer (A)
28. The purpose of lubrication is  
A. To reduce friction  
B. To reduce wear  
C. Transfer heat produced  
D. All of above  
Answer (D)
29. Seizure refers to  
A. Binding and fastening together of the material.  
B. Cracking on the surface.  
C. Significant wear on the surface.  
D. Significant plastic deformation.  
Answer (A)
30. Causes of seizure are: -  
A. Poor heat dissipation.  
B. Poor lubrication.  
C. Smaller clearances.  
D. All of above.  
Answer (D)
31. The thickness of the oxide layer formed on the surface is dependent upon  
A. Rate of rupture of the oxide layer.  
B. Time available to re-oxide.  
C. Rate of formation of oxide layer.  
D. All of the above.  
Answer (D)
32. Scratching is a form of  
A. Abrasive wear  
B. Adhesive wear  
C. Corrosive wear  
D. Fatigue wear  
Answer (A)
33. Erosive wear is a function of  
A. Particle velocity  
B. Impact angle  
C. Size of abrasive  
D. All of above  
Answer (D)
34. Apart from reducing friction and wear, the secondary purpose(s) of lubricant is/are  
A. Heat dissipation  
B. Reducing corrosion  
C. Both (a) and (b)  
D. None of these  
Answer (A)
35. Which of the following is NOT a function of lubricant in IC engine?  
A. Form a film to separate the surfaces.  
B. Adhere to surface.  
C. Withstand high temperature inside the cylinder.  
D. Reduce the size of asperities and improve the surface.  
Answer (D)
36. Synovial fluid is a lubricant that is found in

- A. Human bone joints.  
 B. Gear boxes.  
 C. IC engines.  
 D. Rolling element bearing. Answer (A)
37. As the temperature is increased, the coefficient of friction  
 A. Increases  
 B. Reduces  
 C. Remains unchanged.  
 D. Increases or decreases based on the lubrication regime. Answer (D)
38. Which of the following is a desirable property of boundary lubricant?  
 A. Dissolvability in lubricating oils.  
 B. Affinity to metallic surface.  
 C. Low shear strength and high melting point.  
 D. All of the above. Answer (D)
39. In hydrodynamic lubrication the major source of friction is: -  
 A. Shearing of lubricant film.  
 B. Abrasion due to asperities on tribo-surfaces.  
 C. Abrasion of tribo-surfaces due to force particles.  
 D. All of the above. Answer (A)
40. Which of the following is a desirable property of boundary lubricant?  
 A. Dissolvability in lubricating oils.  
 B. Affinity to metallic surface.  
 C. Low shear strength and high melting point.  
 D. All of above. Answer (D)
41. Which of is not an advantage / benefit of solid lubricant?  
 A. More effective at high loads.  
 B. Resistance to deterioration.  
 C. Good heat dissipation.  
 D. High stable in extreme temperature and environment. Answer (C)
42. Out of the following which is NOT an example of solid lubricant?  
 A. Graphite lubricant.  
 B. Molybdenum Sulphite lubricant.  
 C. Polytetrafluoroethylene lubricant.  
 D. Multi-grade lubricant. Answer (D)
43. Which of the following is/are the constituents of grease?  
 A. Base oil.  
 B. Additive.  
 C. Thickness fiber.  
 D. All of above. Answer (D)
44. Which of the following is NOT the advantage of grease?  
 A. Remains at application point and adhere to the surface.  
 B. Less frequent application needed.  
 C. Good for inclined / vertical shaft.  
 D. Good dissipation of heat. Answer (D)
45. Lubricants converts  
 A. Solid friction into liquid friction.

- B. Liquid friction into solid friction.  
 C. Both “a” and “b”.  
 D. None of the above. Answer (A)
46. The following is not a type of sliding contact bearing  
 A. Ball bearing.  
 B. Journal bearing.  
 C. Roller bearing.  
 D. All of the above. Answer (A)
47. The following is not a type of roller contact bearing  
 A. Ball bearing  
 B. Journal bearing  
 C. Roller bearing.  
 D. All of the above. Answer (B)
48. In thrust bearing, the load acts:  
 A. Perpendicular to the axis of shaft.  
 B. In axial direction.  
 C. Both “a” and “b”.  
 D. None of the above. Answer (B)
49. Boundary friction conditions may develop in journal bearing, when shaft passes through zero speed during  
 A. Starting.  
 B. Stopping  
 C. Reversing.  
 D. All of the above. Answer (D)
50. The pour point test is employed to indicate the stability of oil for ----- temperature operations.  
 A. Low  
 B. High  
 C. Both “a” and “b”.  
 D. None of the above. Answer (A)
51. The flash point of lubricant must be ----- the working temperature.  
 A. Well below.  
 B. Well above.  
 C. Equal to.  
 D. None of the above. Answer (B)
52. Specific gravity of lubricant can be measured by using  
 A. Hydrometer.  
 B. Viscometer.  
 C. Anemometer.  
 D. Pyrometer. Answer (A)
53. API number of water is  
 A. 1  
 B. 5  
 C. 10  
 D. 20 Answer (C)
54. The bi-weekly lubrication is indicated by  
 A. Rectangle

- B. Triangle
- C. Circle
- D. Hexagon

Answer (C)

55. The monthly lubrication is indicated by

- A. Rectangle
- B. Triangle
- C. Circle
- D. Hexagon

Answer (A)

56. The six monthly lubrication is indicated by

- A. Rectangle
- B. Triangle
- C. Circle
- D. Hexagon

Answer (D)

57. The color code for various grades of lubrication is as follows

Grade of lubrication	Color Code
A. Spindle oil	1. Red
B. Heavy-medium	2. Orange
C. Heavy/Extra heavy	3. Brown
D. Grease	4. Yellow

The correct order is

- A. a-3, b-1, c-2, d-4
- B. a-4, b-3, c-1, d-2
- C. a-1, b-2, c-3, d-4
- D. a-4, b-3, c-2, d-1.

Answer (B)

58. Phenomenon of stick-slip occurs because of: -

- A. Large difference between static and kinetic coefficients of friction.
- B. Additional force requirement to move the object.
- C. Increase in hardness of surfaces.
- D. Lubrication is applied on the surfaces.

Answer (A)

59. Which of the following are the major contributors to rolling friction?

- A. Micro-slip effect with the contact area.
- B. Elastic-hysteresis of the contacting materials.
- C. Plastic deformation of the materials and adhesion effects in contact.
- D. All of the above.

Answer (D)

60. Which one of the following is true for ball bearing?

- 1. Sliding occurs between cage and balls.
- 2. Lubricants such as grease are used to reduce friction with ball bearing.
- 3. Cages are meant to bear the load.
- A. Both 1 and 2.
- B. Both 1 and 3.
- C. Both 2 and 3.
- D. All three 1,2 and 3.

Answer (A)

61. If an automobile tire is not filled up to the optimum pressure level; it means:

- A. There would be less hysteresis loss.
- B. Rolling friction would be lower.
- C. More steering controllability.

D. None of these.

Answer (C)

62. To avoid the phenomenon of stick slip due to friction instability, which of the following is the right approach?

- A. Increase the operation speed.
- B. Decrease the operation speed.
- C. Operation speed does not have any effect on the stick-slip process.
- D. Increase the difference between static and kinetic coefficient of friction. Answer (A)

63. In a mechanical system, negative damping due to friction instability causes:

- A. Increase in vibration amplitude over a period of time.
- B. Decrease in vibration.
- C. Amplitude remains unchanged with time.
- D. None of these. Answer (A)

64. Which of the following is NOT true about measurable wear?

- A. Measurable wear is undesirable.
- B. It can cause vibration and noise.
- C. Measurable wear may roughen the surfaces.
- D. It polishes the surfaces. Answer (D)

65.

Which of the following is NOT true about pitting on the gear surface?

- A. It is a surface fatigue failure.
- B. It occurs due to repeated loading of the tooth surface fatigue.
- C. It occurs because contact stress exceeds than the surface fatigue strength of the material.
- D. It occurs because contact stress exceeds the compressive strength of material.

Answer (D)

66. With increase in bearing clearance the load capacity of the bearing:

- A. Increases
- B. Decreases
- C. Does not change.
- D. First decreases and then increases. Answer (B)

67. As per Archard's wear equation, wear volume in adhesive wear is independent of:

- A. Sliding distance of travel.
- B. Load.
- C. Hardness of soft material.
- D. Rolling distance. Answer (D)

68. Wear rate is lesser in 3-body abrasion as compared to 2-body abrasion because:

- A. Energy is consumed in rolling motion of free hand particles.
- B. Only spherical asperities are involved in 3-body abrasion.
- C. Size of the asperities is smaller in 3-body abrasion.
- D. Generally, hardness of free particles is very low. Answer (A)

69. The property of MR fluid is

- A. Viscosity thickening due to magnetic attraction among particles.
- B. Viscosity thinning due to relative sliding.
- C. Reduction in viscosity due to increase in temperature.
- D. All of above. Answer (D)

70. Which of the following represents correct sequence of corrosive wear?

- i. Mechanical sliding at interface.



- ii. Chemical reaction and formation of a reaction product (oxide chloride).
- iii. Wearing away of reaction product film.
  - A. (ii), (i), (iii).
  - B. (ii), (iii), (i).
  - C. (i), (iii), (ii).
  - D. (i), (ii), (iii).

Answer (A)

71. Which one is the common system for oil classification?
- A. SAE (Society of Automobile Engineers).
  - B. API (American Petroleum Institute).
  - C. ISO (International Organization of Standardization).
  - D. All of above.

Answer (D)

72.