

Worksheet A — Questions only (50 questions, 80 marks)

Instructions:

- All questions are compulsory.
 - Draw neat diagrams where requested.
 - Marks for each question are shown in brackets.
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Section A — Multiple Choice Questions ($20 \times 1 = 20$ marks)

Choose the correct option.

1. Friction is a force that acts:
A. in the direction of motion B. opposite to the direction of motion C. upwards D. only when stationary
2. The irregularities or tiny hills and grooves on surfaces are responsible for:
A. gravity B. friction C. magnetism D. elasticity
3. The branch of science that studies friction is called:
A. tribology B. dynamics C. optics D. aerodynamics
4. Which instrument is commonly used to measure force of friction in simple experiments?
A. Thermometer B. Spring balance C. Voltmeter D. Barometer
5. Static friction is:
A. friction when objects are sliding B. friction when objects are rolling C. friction that keeps an object at rest D. friction in fluids
6. Which of the following has the least resistance among the three types of friction?
A. Static friction B. Sliding friction C. Rolling friction D. All equal
7. When we place pencils under a heavy block to move it, we reduce friction because we change sliding friction into:
A. static friction B. rolling friction C. fluid friction D. magnetic force
8. Fluid friction is also called:
A. drag B. thrust C. lift D. frictionless force
9. A streamlined shape helps to:
A. increase drag B. reduce drag C. create static friction D. increase rolling friction
10. Which of the following reduces friction between machine parts?
A. Lubrication B. Making surface rougher C. Adding sand D. Increasing pressure
11. The soles of sports shoes have grooves mainly to:
A. look attractive B. reduce weight C. increase friction/grip D. allow water inside
12. Which is a disadvantage of friction?
A. It helps us walk B. It causes wear and tear C. It lights a matchstick D. It prevents slipping
13. Why do tyres get replaced periodically? Because of:
A. rust B. frictional wear C. decrease of gravity D. magnetic forces

14. Which of these methods will **not** reduce friction?
A. Polishing surfaces B. Lubricating surfaces C. Using ball bearings D. Making surfaces rough
 15. Carrom players sprinkle fine powder to:
A. increase static friction B. reduce friction between striker and board C. polish the board D. increase rolling friction
 16. Which factor does **not** affect fluid friction?
A. Shape of object B. Nature of fluid C. Speed of object D. Colour of object
 17. Streamlining is important for:
A. aeroplanes and fish B. stationary buildings C. books on a shelf D. hanging signs
 18. The effect of friction that produces heat is most noticeable when we:
A. eat food B. rub hands together C. sleep D. look at the sky
 19. Which of the following is true about sliding and static friction?
A. Sliding friction > Static friction B. Sliding friction = Static friction C. Sliding friction < Static friction D. None of the above
 20. Ball bearings are used because:
A. they increase sliding friction B. rolling friction is less than sliding friction C. they stop motion completely D. they increase fluid friction
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Section B — Short objective / Fill-in / Match / True–False (10 × 1 = 10 marks)

21. Fill in the blank: The irregularities on surfaces that interlock and cause friction are called _____.
 22. True or False: Friction can be reduced to zero.
 23. Match (write pairs):
 - a. Static friction — _____
 - b. Rolling friction — _____
 - c. Fluid friction — _____
 24. One-word: The special shape given to objects to reduce drag is called _____.
 25. Fill in: The force that measures how hard an object is pressed against a surface and affects friction is _____.
 26. True or False: Polishing a surface generally reduces friction.
 27. One-word: A thin layer of oil or grease used to decrease friction is called a _____.
 28. Fill in: The science of reducing wear and tear in machines by special designs and lubrication is part of _____.
 29. True or False: Rougher surfaces always give less friction than smoother surfaces.
 30. One-word: A device that converts sliding into rolling motion using small spheres is called a _____.
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Section C — Short answer (10 × 2 = 20 marks)

(Answer in 2–4 lines)

31. Define friction in one sentence.
 32. State two factors on which friction between two solid surfaces depends.
 33. Give one real-life example each for static, sliding and rolling friction.
 34. Why does a heavier object usually experience more friction on the same surface?
 35. Explain why it is easier to push an object once it has started moving than to start it moving (concept in two lines).
 36. What are lubricants and how do they reduce friction? (one short point)
 37. Give two advantages of friction in daily life.
 38. Give two disadvantages of friction in machines.
 39. Explain in two lines how streamlining reduces fluid friction.
 40. Why do athletes use shoes with spikes for certain sports? (one short point)
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Section D — Long answer / Explain & Diagram ($5 \times 5 = 25$ marks)

(Answer in 8–12 lines; diagrams where requested)

41. (5) Draw a labelled diagram to show the three types of friction (static, sliding, rolling) with one example for each.
 42. (5) Describe an experiment (materials, method, observation) using a spring balance to show how friction varies with surface roughness.
 43. (5) Explain fluid friction (drag) — factors on which it depends and two ways engineers reduce it in vehicles.
 44. (5) Discuss advantages and disadvantages of friction — give at least three points in total (mix of both).
 45. (5) Explain how ball bearings and streamlining help machines save energy. Support your answer with two small labelled sketches (ball bearing under a rotating shaft; streamlined body profile).
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Section E — Practical / Quick tasks ($5 \times 1 = 5$ marks)

46. (1) State whether the following is true in a national park: sand is spread on a wet slippery path to _____. (write the purpose)
47. (1) Name one household example where we **increase** friction intentionally.
48. (1) What happens to friction when we polish a surface? (one-word/short)
49. (1) If a car moves faster through air, the fluid friction (drag) on it generally _____. (fill the blank)
50. (1) Name the friction type that helps a matchstick light when rubbed.