GRADE 10 SCIENCE: FORCES & MOTION ASSESSMENT

Instructions: Choose the best answer (A, B, C, or D) for each question.

Name: _____ **Date:** _____ **Score:** _____ / 50

Part 1: Introduction to Forces (Questions 1–12)

1. What is a force?
A) A push or a pull
B) Speed only
C) Heat energy
D) The size of an object

2. What unit do we use to measure force?
A) Kilogram (kg)
B) Newton (N)
C) Meter (m)
D) Second (s)

3. Which force pulls objects toward the center of the Earth?
A) Friction
B) Tension
C) Gravity
D) Magnetism

4. Friction is a force that _____ motion between two surfaces.
A) helps
B) speeds up
C) opposes (stops)
D) creates

5. What kind of force slows down a sky diver falling in the air?
A) Air resistance
B) Magnetic force
C) Gravity
D) Tension

6. When forces on an object are balanced, the net force is:
A) 100 N
B) Zero (0 N)
C) 10 N
D) Unlimited

7. What happens to a stationary object when forces are balanced?
A) It starts moving
B) It stays still
C) It explodes
D) It falls down

8. What causes an object to change its motion?
A) Balanced forces
B) Unbalanced forces
C) Constant mass
D) Zero acceleration

9. What is the combination of all forces acting on an object called?
A) Total speed
B) Net force
C) Mass
D) Gravity force

10. If you push a box right with 10 N and a friend pushes left with 10 N, what is the net force?
A) 20 N right
B) 10 N left
C) 0 N
D) 5 N up

11. If you push a box right with 15 N and a friend pushes right with 5 N, what is the net force?
A) 10 N right
B) 20 N right
C) 20 N left
D) 0 N

12. Which instrument is used to measure force in a laboratory?
A) Thermometer
B) Ruler
C) Spring balance
D) Stopwatch

Part 2: Newton's First Law of Motion (Questions 13–21)

13. Newton's First Law is also known as the Law of:
A) Acceleration
B) Action-Reaction
C) Inertia
D) Gravity

14. What is inertia?
A) Resistance to change in motion
B) Ability to move fast
C) The force of gravity
D) Energy of a moving car

15. An object at rest will stay at rest unless acted upon by an:
A) Equal force
B) Unbalanced force
C) Internal force
D) Unknown force

16. Which object has the most inertia?
A) A tennis ball
B) A bicycle
C) A heavy truck
D) A skateboard

17. Why do passengers slide forward when a bus suddenly stops?
A) Due to gravity
B) Due to inertia
C) Due to air pressure
D) Due to magnetism

18. Inertia depends directly on an object's:
A) Speed
B) Volume
C) Mass
D) Height

19. A rolling ball on carpet slows down and stops mainly because of:

A) Friction
B) Gravity pulling it sideways
C) Lack of inertia
D) Its mass decreasing

20. If an object is moving in deep space with no forces acting on it, it will:

A) Stop immediately
B) Slow down slowly
C) Keep moving at constant speed
D) Fall down

21. Seatbelts protect car passengers by stopping the effect of:

A) Gravity
B) Inertia
C) Friction
D) Magnetism

Part 3: Newton's Second Law of Motion (Questions 22–30)

22. What is the correct formula for Newton's Second Law?

A) F = m / a
B) F = m × a
C) F = m + a
D) F = a / m

23. In the equation F = m × a, what does 'm' stand for?

A) Motion
B) Meters
C) Mass
D) Momentum

24. If force increases on an object with constant mass, acceleration will:

A) Decrease
B) Increase
C) Stay the same
D) Become zero

25. If you push a light box and a heavy box with the same force, which accelerates faster?

A) The heavy box
B) The light box
C) Both accelerate the same
D) Neither box moves

26. What force is required to accelerate a 2 kg mass at 3 m/s²?

A) 5 N
B) 6 N
C) 1.5 N
D) 1 N

27. What is acceleration?

A) The weight of an object
B) The rate of change of speed or direction
C) The distance traveled
D) The amount of matter in an object

28. Which unit is commonly used for acceleration?

A) m/s²
B) kg
C) N
D) km/h

29. If mass increases while force stays constant, acceleration:

A) Increases
B) Decreases
C) Doubles
D) Remains unchanged

30. Calculate the acceleration of a 10 kg object pushed with a net force of 50 N.

A) 500 m/s²
B) 5 m/s²
C) 0.2 m/s²
D) 40 m/s²

Part 4: Newton's Third Law of Motion (Questions 31–38)

31. Newton's Third Law states that for every action, there is an equal and ____ reaction.

A) Same
B) Opposite
C) Double
D) Smaller

32. Action and reaction forces always act on:

A) The same object
B) Different objects
C) Three objects
D) Stationary objects only

33. When you push against a wall, the wall pushes back against you with:

A) Less force
B) More force
C) Equal force
D) Zero force

34. A rocket launches upward because gas pushes downward. This is an example of:

A) First Law
B) Second Law
C) Third Law
D) Law of Friction

35. When a swimmer pushes water backward, what pushes the swimmer forward?

A) The air
B) The water
C) Gravity
D) The swimmer's weight

36. Forces always occur in:

A) Single units
B) Pairs
C) Groups of three
D) Random amounts

37. If a tennis racket hits a ball with 50 N of force, the ball hits the racket with:

A) 0 N
B) 25 N
C) 50 N
D) 100 N

38. Walking is possible because your foot pushes the ground back, and the ground:

A) Pushes your foot forward
B) Pulls your foot down
C) Moves backward
D) Absorbs the force

Part 5: Stability and Center of Gravity (Questions 39–45)

39. What is the Center of Gravity (CG)?

A) The top point of an object
B) The point where all weight is balanced
C) The bottom base of an object
D) The heaviest edge of an object

40. An object is MORE stable if its center of gravity is:

A) Higher
B) Lower
C) Outside the object
D) Moving fast

41. An object is MORE stable if its base of support is:

A) Narrower
B) Wider
C) Rounder
D) Taller

42. Which object is most likely to tip over easily?

A) A tall vase with a small base
B) A short box with a wide base
C) A flat pyramid
D) A heavy floor mat

43. Why do sports cars have low heights?

A) To look nice
B) To lower CG and improve stability
C) To increase mass
D) To reduce friction

44. What happens when the center of gravity falls outside the base of support?

A) The object stops moving
B) The object tips over
C) The object rises up
D) Nothing happens

45. Why do martial artists widen their stance (spread feet apart)?

A) To decrease stability
B) To increase base of support
C) To raise their center of gravity
D) To jump higher

Part 6: Equilibrium (Questions 46–50)

46. What does it mean when an object is in mechanical equilibrium?

A) Net force is greater than zero
B) Net force is equal to zero
C) Object is accelerating fast
D) Object is falling

47. A book sitting still on a flat desk is in:

A) Dynamic equilibrium
B) Static equilibrium
C) Unstable state
D) Free fall

48. A car traveling at a constant speed in a straight line is in:

A) Static equilibrium
B) Dynamic equilibrium
C) Unbalanced state
D) Rotational acceleration

49. If a cone is resting flat on its base, its equilibrium state is:

A) Stable
B) Unstable
C) Neutral
D) Moving

50. If a cone is balanced carefully on its sharp tip, its equilibrium is:

A) Stable
B) Unstable
C) Neutral
D) Permanent