**Government Polytechnic Chapra**

Subject - Engineering Mechanics (2002205)

1. Define force and provide examples of contact and non-contact forces.

2. Explain the principle of the parallelogram of forces.

3. Define the term "resultant force" and discuss its significance.

4. Describe the process of resolving a force into its components.

5. Discuss the conditions for equilibrium of a particle under the action of forces.

6. Explain the significance of the triangle of forces in vector addition.

7. Define the term "concurrent forces" and provide examples.

8. Discuss the concept of the moment of a force and its applications.

9. Explain the process of finding the equilibrant of a system of forces.

10. Discuss the analytical methods for resolving forces.

11. What is a rigid body, and how does it differ from a deformable body?

12. Define the moment of a force.

13. Explain the difference between a scalar and a vector quantity in rigid body mechanics.

14. Explain the parallel-axis theorem for moment of inertia.

15. Discuss the moment of inertia of common shapes like rods, discs, and spheres.

16. What is the difference between static and dynamic equilibrium for a rigid body?

17. Explain the concept of center of mass in rigid body mechanics.

18. Define the term "kinematics" in rigid body motion.

19. Define the term "momentum of inertia" and discuss its physical meaning.

20. Discuss the concepts of polar and axial moments of inertia.

21. Define the term "couple" in the context of rigid body mechanics.

22. Explain the principle of superposition in analyzing forces on a rigid body.

23. Discuss the equilibrium conditions for a rigid body subjected to forces.

24. Define the term "centroid" in rigid body mechanics.

25. Explain the principle of equilibrium of a rigid body under coplanar forces.

26. Define the term "beam" in rigid body mechanics

27. Define static friction and explain its role in stationary objects.

28. What factors affect the magnitude of static friction?

29. Discuss the difference between static and kinetic friction.

30. Explain the concept of the coefficient of friction.

31. How does the angle of repose relate to static friction?

32. Define limiting friction and its significance in static equilibrium.

33. Discuss the impact of surface roughness on static friction.

34. Explain the role of normal force in calculating frictional forces.

35. What is the maximum possible static friction force?

36. Discuss the concept of impending motion in static friction.

37. How does the inclination of a surface affect static friction?

38. Explain the role of lubricants in reducing static friction.

39. Discuss the influence of temperature on static friction.

40. What is the significance of the angle of friction in static equilibrium?

41. Provide examples of everyday situations where static friction is crucial.

42. What is the mechanical advantage of a simple machine, and how is it calculated?

43. Explain the working principle of a pulley system in lifting.

44. Define the term "efficiency" in the context of a simple lifting machine.

45. Discuss the advantages and disadvantages of using a lever in lifting.

46. How does the concept of a block and tackle increase the lifting force?

47. Explain the role of friction in affecting the efficiency of a simple lifting machine.

48. Discuss the application of a screw jack in lifting heavy loads.

49. Define the term "velocity ratio" in the context of simple machines.

50. Explain how a hydraulic lift system works in lifting vehicles.

51. Discuss the differences between a fixed pulley and a movable pulley.