SSC GD Constable Exam: Time and Work Syllabus Summary

Overview:
The Time and Work topic is an essential part of the Mathematics section in the SSC GD Constable Exam, contributing approximately 2–4 questions (4–8 marks out of 160 total marks) in the Computer-Based Examination (CBE). The syllabus focuses on calculating the time taken by individuals or groups to complete tasks, work rates, and their applications in scenarios involving collaborative or individual work. Questions test computational accuracy, formula application, and problem-solving skills at a 10th-grade level. The exam includes 80 questions (2 marks each, 0.50 negative marking per wrong answer) to be completed in 60 minutes.

Key Topics in Time and Work:

1. Work Rate: Understanding the rate at which individuals or groups complete work.
2. Individual Work: Calculating time or work done by one person.
3. Combined Work: Determining time taken by multiple workers working together.
4. Work Efficiency: Comparing efficiencies of workers and their impact on time.
5. Pipes and Cisterns: Problems involving filling or emptying tanks (a variation of time and work).
6. Work and Days: Calculating days required to complete a task based on work rates.
7. Word Problems: Real-world scenarios (e.g., construction, painting, tank filling).
8. LCM Method: Using the Least Common Multiple to solve work problems.

Important Formula and Techniques:

1. Basic Work Formula:
   - Work = Rate × Time (or) Time = Work / Rate (or) Rate = Work / Time.
   - If a person completes a work in T days, their work rate = 1/T work per day.

- Example: If A completes a task in 5 days, Rate = 1/5 work per day.

2. Combined Work:
- If A completes a task in a days and B in b days, work rate of A = 1/a, B = 1/b.
- Combined work rate = (1/a + 1/b) = (a + b)/(a × b).
- Time taken together = 1 / Combined work rate = (a × b)/(a + b).
- Example: A takes 6 days, B takes 8 days, Combined time = (6 × 8)/(6 + 8) = 48/14 = 24/7 days.

3. LCM Method for Work Problems:
- Find LCM of the days taken by individuals to represent total work.
- Calculate work done per day by each person based on LCM.
- Example: A takes 4 days, B takes 6 days, LCM = 12 units (total work).
  - A's work rate = 12/4 = 3 units/day, B's work rate = 12/6 = 2 units/day.
  - Together, they do 3 + 2 = 5 units/day, Time = 12/5 = 2.4 days.

4. Work Efficiency:
- Efficiency is inversely proportional to time taken (Efficiency ∝ 1/Time).
- Example: If A takes 5 days and B takes 10 days, A's efficiency = 2 units, B's efficiency = 1 unit (ratio 2:1).

5. Pipes and Cisterns:
- Filling pipe: Rate = 1/T (T = time to fill tank).
- Emptying pipe: Rate = −1/T (negative for emptying).
- Combined rate = Sum of individual rates.
- Example: Pipe A fills a tank in 4 hours (rate = 1/4), Pipe B empties in 6 hours (rate = −1/6). Combined rate = 1/4 − 1/6 = (3 − 2)/12 = 1/12 tank/hour. Time to fill = 12 hours.

6. Work with Different Efficiencies:
- If A is k times more efficient than B, A's time = B's time / k.
- Example: A is twice as efficient as B. If B takes 12 days, A takes 12/2 = 6 days.

7. Word Problem Applications:
- Example (Combined Work): A takes 10 days, B takes 15 days to complete a task. Time together = (10 × 15)/(10 + 15) = 150/25 = 6 days.
- Example (Pipes): Pipe A fills a tank in 5 hours, Pipe B in 10 hours. Together, rate = 1/5 + 1/10 = 3/10 tank/hour, Time = 10/3 hours.
- Example (Partial Work): A works for 3 days (rate 1/5), completes 3/5 work. Remaining 2/5 work done by B (rate 1/10) in (2/5) / (1/10) = 4 days.

Key Points for SSC GD Preparation:

- Focus Areas: Calculating individual and combined work rates, pipes and cisterns, and solving word problems (e.g., collaborative tasks, tank filling) are frequently tested.
- Question Types: Direct calculations (e.g., time for A and B to work together), efficiency-based problems, pipes and cisterns, and word problems (e.g., days to complete a task).
- Difficulty Level: 10th-grade level, requiring accurate formula application and quick calculations.
- Practice Tips: Memorize work rate and combined work formulas, practice LCM method for work problems, and solve word problems from past SSC GD papers to improve speed and accuracy.
