SSC GD Constable Exam: Ratio and Time Syllabus Summary

Overview:

The Ratio and Time topic is a focused component of the Mathematics section in the SSC GD Constable Exam, contributing approximately 1–3 questions (2–6 marks out of 160 total marks) in the Computer-Based Examination (CBE). The syllabus emphasizes the application of ratios to solve problems involving time, such as work rates, time allocation, or time-based comparisons in real-world scenarios. Questions test computational accuracy, understanding of ratio concepts, and their application to time-related problems 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 Ratio and Time:

1. Ratio Basics: Understanding and simplifying ratios related to time.
2. Time Allocation: Dividing time in a given ratio.
3. Work and Time: Applying ratios to calculate time taken by individuals or groups based on work rates.
4. Speed and Time: Using ratios in time calculations for distance or speed problems.
5. Proportion in Time: Direct and inverse proportion in time-based scenarios.
6. Word Problems: Real-world applications involving time ratios (e.g., work completion, travel time).
7. Efficiency and Time: Relating efficiency ratios to time taken for tasks.
8. Combined Time: Calculating combined time using ratios for collaborative tasks.

Important Formula and Techniques:

1. Ratio Basics:
   - A ratio a:b compares two quantities, written as a/b or a:b.
   - Simplification: Divide both terms by their Highest Common Factor (HCF).

- Example: 12:18 = (12÷6):(18÷6) = 2:3.
- Equivalent Ratios: Multiply or divide both terms by the same non-zero number.
  - Example: 2:3 = (2×2):(3×2) = 4:6.

2. Dividing Time in a Ratio:
- For time T divided in ratio a:b, parts are (a/(a+b)) × T and (b/(a+b)) × T.
- Example: Divide 10 hours in ratio 2:3:
  - First part = (2/(2+3)) × 10 = 4 hours.
  - Second part = (3/(2+3)) × 10 = 6 hours.

3. Proportion in Time (Direct and Inverse):
- Direct Proportion: If time T is proportional to a quantity (e.g., workers), $T_1/T_2 = N_2/N_1$.
  - Example: 5 workers take 10 days, 10 workers take T days: 10/T = 10/5, T = 5 days.
- Inverse Proportion: If time T is inversely proportional to a quantity (e.g., workers), $T_1 \times N_1 = T_2 \times N_2$.
  - Example: 5 workers take 10 days, 10 workers take T days: 5 × 10 = 10 × T, T = 5 days.

4. Work and Time (Ratio of Efficiencies):
- If A completes a task in a days and B in b days, efficiency ratio = b:a (inverse of time ratio).
- Combined time = (a × b)/(a + b).
- Example: A takes 6 days, B takes 8 days, Efficiency ratio = 8:6 = 4:3, Combined time = (6 × 8)/(6 + 8) = 48/14 = 24/7 days.

5. Speed and Time (Ratio Application):
- Time = Distance / Speed, Time ratio is inverse of speed ratio.
- Example: Two cars cover 100 km at speeds in ratio 2:3, Time ratio = 3:2.
  - Time for first car = 100 / 2k = 50/k hours, second car = 100 / 3k = 33.33/k hours.

6. Word Problem Applications:
- Example (Time Allocation): Divide 12 hours between two tasks in ratio 3:5.
  - First task = (3/(3+5)) × 12 = 4.5 hours, Second task = (5/(3+5)) × 12 = 7.5 hours.
- Example (Work and Time): A and B can do a job in 10 and 15 days, respectively. Time together = (10 × 15)/(10 + 15) = 150/25 = 6 days.
- Example (Speed and Time): Two runners with speeds in ratio 4:5 cover 20 km. Time ratio = 5:4, Times = (20/4k) and (20/5k) = 5/k and 4/k hours.

Key Points for SSC GD Preparation:

- Focus Areas: Simplifying ratios, applying ratios to time-based problems (e.g., work, speed), and solving word problems involving time allocation or efficiency are frequently tested.
- Question Types: Direct ratio calculations (e.g., divide 10 hours in 2:3), work-time problems, speed-time ratios, and word problems (e.g., collaborative task completion).
- Difficulty Level: 10th-grade level, requiring quick calculations and understanding of ratio applications in time-related contexts.
- Practice Tips: Memorize ratio and proportion formulas, practice work and speed-related word problems, and solve past SSC GD papers to improve speed and accuracy.
