TYBA COACHING CENTRE, AJMER

RMS / RMC CLASS VI MATHEMATICS • CHAPTER 14: MEASUREMENT & METRIC SYSTEM (मापन एवं मीट्रिक प्रणाली) — COMPLETE MASTER NOTES

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1. FUNDAMENTALS OF MEASUREMENT & THE METRIC LADDER — Section 1

1.1 What is Measurement? (मापन क्या है?): Measurement is the comparison of an unknown quantity with a known fixed standard quantity called a **Unit**. Every measurement has two parts: a **numerical value** and a **unit** (e.g., 5 kg: 5 is numerical value, kg is unit). The **Metric System** (SI system) is based on powers of **10**, making conversions quick and decimal-friendly.

किसी अज्ञात राशि की तुलना एक निश्चित मानक मात्रक (Unit) से करना मापन कहलाता है। मीट्रिक प्रणाली 10 की घात पर आधारित है।



Figure 1: The Metric Conversion Ladder (मीट्रिक रूपांतरण सीढ़ी)

Solved Example 1 (Ladder Conversion): Convert 4.5 km into (i) metres and (ii) centimetres.
Solution: (i) km → m is 3 steps right (×1,000): 4.5 × 1,000 = **4,500 m**. (ii) km → cm is 5 steps right (×1,00,000): 4.5 × 1,00,000 = **4,50,000 cm**.

हल: (i) 4.5 × 1,000 = 4,500 मीटर; (ii) 4.5 × 1,00,000 = 4,50,000 सेमी।

2. MEASUREMENT OF LENGTH (लम्बाई का मापन) — Section 2

2.1 Metric & Imperial Length Units: Standard unit is **Metre (m)**. 1 km = 1,000 m | 1 m = 100 cm = 1,000 mm | 1 cm = 10 mm. Imperial units used in RMS CET: **1 inch = 2.54 cm** | **1 foot = 12 inches = 30.48 cm** | **1 yard (गज) = 3 feet = 36 inches** | **1 mile ≈ 1.6 km** (5 miles ≈ 8 km).

1 किमी = 1,000 मी; 1 मी = 100 सेमी; 1 सेमी = 10 मिमी; 1 इंच = 2.54 सेमी; 1 फुट = 12 इंच; 1 गज = 3 फुट; 1 मील ≈ 1.6 किमी।

Solved Example 2 (Zero Trap!): Convert 7 km 35 m into metres, and 9 m 5 mm into millimetres.
Solution: 7 km 35 m = 7,000 + 35 = **7,035 m** (NOT 735 m!). Similarly, 9 m 5 mm = 9,000 + 5 = **9,005 mm**.

हल: 7 किमी 35 मी = 7,035 मी (735 नहीं!); 9 मी 5 मिमी = 9,005 मिमी।

Solved Example 3 (Ribbon Cutting): A 15 m long ribbon is cut into equal pieces of 50 cm each. How many pieces are obtained?
Solution: Convert 15 m into cm: 15 × 100 = 1,500 cm. Pieces = 1,500 ÷ 50 = **30 pieces**.

हल: 15 मीटर = 1,500 सेमी; टुकड़ों की संख्या = 1,500 ÷ 50 = 30 टुकड़े।

3. MEASUREMENT OF MASS / WEIGHT (द्रव्यमान का मापन) — Section 3

3.1 Heavy & Micro Weight Units: Standard SI unit is **Kilogram (kg)**. 1 kg = 1,000 g | 1 g = 1,000 mg | 1 kg = 10,00,000 mg. For agricultural/truck loads: **1 Quintal = 100 kg**; **1 Metric Tonne = 1,000 kg = 10 Quintals**. For medicines/gold: 1 Carat = 200 mg = 0.2 g.

1 किग्रा = 1,000 ग्राम; 1 ग्राम = 1,000 मिग्रा; 1 क्विंटल = 100 किग्रा; 1 मीट्रिक टन = 1,000 किग्रा = 10 क्विंटल।

Solved Example 4 (Truck Load): A truck carries 4.5 metric tonnes of wheat. How many 50 kg bags can be filled?
Solution: 4.5 tonnes = 4.5 × 1,000 = 4,500 kg. Number of bags = 4,500 ÷ 50 = **90 bags**.

हल: 4.5 टन = 4,500 किग्रा; बोरों की संख्या = 4,500 ÷ 50 = 90 बोरे।

Solved Example 5 (Mixed Subtraction): Subtract 6 kg 750 g from 12 kg 200 g.
Solution: Write as decimals: 12.200 kg − 6.750 kg = 5.450 kg = **5 kg 450 g**.

हल: 12.200 − 6.750 = 5.450 किग्रा (5 किग्रा 450 ग्राम)।

Solved Example 6 (Tablets Weight): If 1 tablet weighs 500 mg, find the weight of 100 such tablets in grams.
Solution: 100 × 500 mg = 50,000 mg = 50,000 ÷ 1,000 = **50 g**.

हल: 100 × 500 mg = 50,000 mg = 50 ग्राम।

4. MEASUREMENT OF CAPACITY & VOLUME BRIDGE (धारिता) Section 4

4.1 Capacity & Volume–Capacity Link: Standard unit is **Litre (L)**. 1 kL = 1,000 L | 1 L = 1,000 mL. Important Mensuration Link: **1 cm^3 (1 cc) = 1 mL** | **1,000 cm^3 = 1 Litre** | **1 m^3 = 1,000 Litres = 1 Kilolitre**.

1 किलोलीटर = 1,000 लीटर; 1 लीटर = 1,000 मिलीलीटर। आयतन संबंध: 1 घन सेमी = 1 mL; 1,000 घन सेमी = 1 लीटर; 1 घन मीटर = 1,000 लीटर।

Solved Example 7 (Water Tank Bottles): A tank holds 2.5 kL of water. How many 500 mL bottles can be filled from it?
Solution: 2.5 kL = 2,500 L = 25,00,000 mL. Bottles = 25,00,000 ÷ 500 = **5,000 bottles**.

हल: 2.5 kL = 25,00,000 mL; बोतलें = 25,00,000 ÷ 500 = 5,000 बोतलें।

Solved Example 8 (Addition of Litres): Add 4 L 750 mL, 3 L 450 mL, and 2 L 800 mL.
Solution: 4.750 + 3.450 + 2.800 = **11.000 L (11 Litres)**.

हल: 4.750 + 3.450 + 2.800 = 11 लीटर।

5. TIME, 24-HOUR CLOCK, CALENDAR & COUNTING UNITS Section 5

5.1 Time, 24-Hour Clock & Leap Year Rules: 1 hr = 60 min = **3,600 sec**. To convert PM to 24-hr clock, add 12 hours (4:35 PM = **16:35 hrs**). A year is a **Leap Year (366 days)** if divisible by 4, EXCEPT century years (ending in 00), which must be divisible by **400** (2000 was leap; 1900 & 2100 are NOT leap).

PM समय को 24-घंटे में बदलने के लिए 12 जोड़ें। शताब्दी वर्ष 400 से विभाज्य होने पर ही लीप वर्ष (366 दिन) होता है।

5.2 Counting & Paper Units: 1 Dozen = 12 | **1 Score = 20** | **1 Gross = 144** (12 Dozen) | **1 Ream = 500 sheets** | 1 Decade = 10 yrs | 1 Century = 100 yrs | 1 Millennium = 1,000 yrs.

1 दर्जन = 12; 1 स्कोर = 20; 1 ग्रॉस = 144; 1 रिम = 500 शीट; 1 दशक = 10 वर्ष; 1 शताब्दी = 100 वर्ष।

Solved Example 9 (Journey Duration): A bus leaves at 8:50 AM and reaches its destination at 1:15 PM. Find the journey time.
Solution: 8:50 AM to 12:00 Noon = 3 hr 10 min. 12:00 Noon to 1:15 PM = 1 hr 15 min. Total = **4 hrs 25 min**.

हल: 8:50 से 12:00 = 3 घंटे 10 मिनट; 12:00 से 1:15 = 1 घंटा 15 मिनट ⇒ कुल = 4 घंटे 25 मिनट।

Solved Example 10 (Score & Gross Cost): Find the cost of 3 Score pencils at ₹5 per pencil.
Solution: 1 Score = 20 ⇒ 3 Score = 60 pencils. Total Cost = 60 × 5 = **₹300**.

हल: 3 स्कोर = 60 पेंसिल; कुल मूल्य = 60 × 5 = ₹300।

6. COMMON EXAM TRAPS & REVISION CHECKLIST

Section 6

Common RMS Exam Mistake (सामान्य गलती)	Correct Rule (सही नियम)
Writing 7 km 45 m as 745 m	Always pad zeros: **7,045 m** (since 1 km = 1,000 m)
Treating 1900 as a Leap Year (÷4)	Century years must divide by **400** (1900 is ordinary)
Borrowing 100 minutes from 1 hour	1 hour = **60 minutes** (borrow 60, not 100!)
Confusing 1 Quintal and 1 Tonne	1 Quintal = **100 kg**; 1 Metric Tonne = **1,000 kg**

Narayan Sir's 100% Score Checklist: (1) Master KHD[U]DCM ladder. (2) Memorise 1 Quintal = 100 kg, 1 Tonne = 1,000 kg, 1 m^3 = 1,000 L, 1 Gross = 144, 1 Score = 20. (3) Convert mixed units to the same unit before dividing or subtracting!

100% अंक मंत्र: (1) KHD[U]DCM सीढ़ी याद रखें, (2) क्विंटल/टन/ग्रॉस/स्कोर मान याद रखें, (3) समान इकाई में बदलकर हल करें!