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Complete revision notes, top 12 high-weightage chapters, formula cheat sheets, and 35+ solved PYQ-pattern questi...

1. EXAM / NOTIFICATION KEY FACTS & DATES

Conducting Body	JKSSB
Post / Course Name	Junior Engineer (Mechanical)
Total Vacancies	127 Posts
Minimum Qualification	Diploma, B.Tech/B.E
Exam / Recruitment	State PSC
Post / Course	Junior Engineer (Mechanical)
Eligibility Level	Diploma, B.Tech/B.E
Preparation Focus	High-Weightage Chapters + Solved PYQs + Mock Test

2. 4-STEP SMART PREPARATION PLAN

1. Phase 1 (Days 1-7): Analyse the official exam pattern and solve 2 previous year papers to identify high-frequency topics.
2. Phase 2 (Days 8-18): Study the 12 High-Weightage Chapters and Master Formula Tables given in this Selection E-Book.
3. Phase 3 (Days 19-25): Solve all 35 Solved PYQ-Pattern Questions and practice the 15-Question Timed Mini Mock Test.
4. Phase 4 (Final 5 Days): Revise the Golden Shortcuts, Quick-Reference Tables, and follow the Exam-Hall Time Strategy.

3. SAMPLE GOLDEN SHORTCUTS & FORMULAS

* Successive Percentage Trick: Net % change = x + y + (xy / 100). Works for Price-Consumption, Area of Rectangle, and Successive Discounts.
* 2-Year & 3-Year CI vs SI Difference: For 2 yrs = P(R/100)^2; For 3 yrs = P(R/100)^2 x (3 + R/100).
* Boats & Streams: Downstream speed (D) = u + v; Upstream speed (U) = u - v. Speed of boat u = (D+U)/2; Speed of stream v = (D-U)/2.
* Polygon Angles: Sum of interior angles = (n - 2) x 180 deg. Sum of exterior angles of any convex polygon is always 360 deg.

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4. TOP 10 HIGH-WEIGHTAGE SYLLABUS TOPICS (QUICK SUMMARY)

1. Number System, Divisibility, LCM-HCF & Remainder Theorem
Weightage: High (4-5 Qs)

Divisibility rules: by 3 & 9 (sum of digits), by 8 (last 3 digits), by 11 (difference of odd and even place digits = 0 or multiple of 11). Product of two numbers = LCM x HCF. For fractions: LCM = LCM(Numerators)/HCF(D...

2. Percentage, Profit-Loss, Discount & Dishonest Dealer Tricks
Weightage: High (4-6 Qs)

Memorize key fractions: 1/6 = 16.66%, 1/7 = 14.28%, 1/8 = 12.5%, 1/9 = 11.11%, 1/12 = 8.33%, 3/8 = 37.5%. Successive change of x% and y% = x + y + (xy/100). Relation between Marked Price (MP) and Cost Price (CP): MP /...

3. Simple Interest, Compound Interest & Installment Shortcuts
Weightage: High (3-4 Qs)

SI = (P x R x T)/100. For 2 years at R%: Effective CI rate = 2R + (R^2 / 100). Difference between 2-year CI and SI = P x (R/100)^2. Difference between 3-year CI and SI = P x (R/100)^2 x (3 + R/100). Rule of 72: Approx...

4. Ratio, Proportion, Partnership, Mixture & Alligation
Weightage: High (3-5 Qs)

If A:B = m:n and B:C = p:q, then A:B:C = mp : np : nq. In Partnership, Profit share = Capital x Time. Alligation Rule: (Cheaper Quantity / Dearer Quantity) = (Dearer Price - Mean Price) / (Mean Price - Cheaper Price)....

5. Time & Work, Pipes-Cisterns & Time-Speed-Distance (Trains/Boats)
Weightage: High (4-6 Qs)

Total Work = LCM of individual days. M1 x D1 x H1 / W1 = M2 x D2 x H2 / W2. Average speed for equal distance = 2xy / (x + y). Unit conversion: km/hr to m/s -> multiply by 5/18; m/s to km/hr -> multiply by 18/5. Trains...

6. Algebra, Mensuration 2D/3D, Geometry & Trigonometry Identities
Weightage: High (4-6 Qs)

If x + 1/x = k, then x^2 + 1/x^2 = k^2 - 2, and x^3 + 1/x^3 = k^3 - 3k. If a + b + c = 0, then a^3 + b^3 + c^3 = 3abc. Equilateral triangle area = (sqrt(3)/4) x a^2. Cylinder Volume = pi x r^2 x h; Cone Volume = (1/3)...

7. Logical & Verbal Reasoning: Series, Coding, Syllogism & Blood Relations
Weightage: High (5-7 Qs)

Alphabet positions: EJOTY = 5, 10, 15, 20, 25. Opposite pairs sum to 27 (A=1 Z=26, B=2 Y=25). Number series priority check: (1) Prime numbers, (2) Squares/Cubes +/- 1, (3) Alternating series, (4) Double differ...

8. Seating Arrangement, Puzzles, Dice, Calendar & Direction Sense
Weightage: Medium-High (4-5 Qs)

Circular arrangement: Facing center -> Left is clockwise, Right is anti-clockwise. Standard Dice: opposite faces sum to 7. When two dice positions share 1 common face, rotate clockwise from the common face to find opp...

9. Indian Polity, Constitution Parts, Schedules & Landmark Amendments
Weightage: High (4-5 Qs)

Borrowed features: Fundamental Rights & Judicial Review (USA), DPSP (Ireland), Parliamentary system & Writs (UK), Fundamental Duties & Five-Year Plans (USSR), Concurrent List (Australia). Key Articles: Art 14 (Equalit...

10. Ancient, Medieval & Modern Indian History (National Movement)
Weightage: High (3-5 Qs)

Indus Valley sites: Lothal (Dockyard, Gujarat), Kalibangan (Bangles/Ploughed field, Rajasthan), Dholavira (Water management, Gujarat), Mohenjo-daro (Great Bath). Buddhism Councils: 1st Rajgriha (Ajatashatru), 2nd Vais...

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5. 10 SAMPLE EXAM-STYLE PRACTICE MCQS (WITH ANSWERS)

Q1. If the price of an item increases by 25%, by what percent must a household reduce its consumption so that expenditure remains unchanged?
(A) 20% (B) 25% (C) 16.66% (D) 15%
Ans: (A) | Reduction % = [R / (100 + R)] x 100 = (25 / 125) x 100 = 20%.

Q2. A can finish a work in 12 days and B in 15 days. If they work together, in how many days will they complete the work?
(A) 6 days (B) 6.67 days (20/3 days) (C) 7.5 days (D) 8 days
Ans: (B) | LCM of 12 and 15 is 60 units. A does 5 units/day, B does 4 units/day. Together = 60 / (5+4) = 20/3 days.

Q3. The difference between Compound Interest and Simple Interest on a sum for 2 years at 10% per annum is Rs. 45. What is the Principal sum?
(A) Rs. 4,000 (B) Rs. 4,500 (C) Rs. 5,000 (D) Rs. 3,600
Ans: (B) | Diff = P x (R/100)^2 => 45 = P x (10/100)^2 => P = Rs. 4,500.

Q4. Find the missing number in the series: 7, 15, 31, 63, 127, ?
(A) 254 (B) 255 (C) 256 (D) 245
Ans: (B) | Pattern is (x2 + 1): 7x2+1=15, 15x2+1=31, 31x2+1=63, 63x2+1=127, 127x2+1 = 255.

Q5. Which Article of the Indian Constitution empowers the Supreme Court to issue Writs for the enforcement of Fundamental Rights?
(A) Article 21 (B) Article 32 (C) Article 226 (D) Article 14
Ans: (B) | Article 32 (Right to Constitutional Remedies) empowers the Supreme Court to issue 5 types of writs; Article 226 empowers High Courts.

Q6. By which Constitutional Amendment were Fundamental Duties added to the Constitution of India?
(A) 42nd Amendment, 1976 (B) 44th Amendment, 1978 (C) 73rd Amendment, 1992 (D) 86th Amendment, 2002
Ans: (A) | On the recommendation of the Swaran Singh Committee, the 42nd Amendment (1976) added Part IV-A (Article 51A).

Q7. A train 150 m long passes a pole in 15 seconds. What is the speed of the train in km/hr?
(A) 30 km/hr (B) 36 km/hr (C) 45 km/hr (D) 54 km/hr
Ans: (B) | Speed in m/s = 150 / 15 = 10 m/s. In km/hr = 10 x (18/5) = 36 km/hr.

Q8. Which vitamin is essential for blood clotting in the human body?
(A) Vitamin A (B) Vitamin C (C) Vitamin D (D) Vitamin K
Ans: (D) | Vitamin K (Phylloquinone) synthesizes prothrombin in the liver, which is required for blood coagulation.

Q9. Choose the grammatically correct option: "Neither the manager nor the employees _____ present at the meeting."
(A) was (B) were (C) has been (D) is
Ans: (B) | With "Neither...nor", the verb agrees with the nearer subject ("employees", plural), so "were" is correct.

Q10. The Tropic of Cancer (23.5 deg N) passes through how many states in India?
(A) 6 states (B) 7 states (C) 8 states (D) 9 states
Ans: (C) | It passes through 8 states: Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, Jharkhand, West Bengal, Tripura, and Mizoram.

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