

Time: One Hour

Maximum: 35 Marks

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| Name: | | Section A | | Total Marks |
| Class: | Marks Scored | Section B | | |
| | | Section C | | |

Section A

(Each question carries 3 marks, Max marks for section - 7)

1. Evaluate $\int \cos(7\theta + 5) d\theta$
2. Evaluate $\int \frac{1}{\cos^2 2\theta} d\theta$
3. Express $1 + 2 + 4 + 8 + 16 + 32$ in sigma notation.

Section B

(Each question carries 6 marks, Max marks for section -18)

4. State and prove the mean value theorem for definite integrals.
5. (a) Evaluate $\int_{-1}^1 3x^2 \sqrt{x^3 + 1} dx$
 (b) Evaluate $\int_0^{\sqrt{7}} t(t^2 + 1)^{\frac{1}{3}} dt$
6. (a) Evaluate $\int_0^2 \left(\frac{t^2}{4} - 7t + 5\right) dt$
 (b) Show that the value of $\int_0^1 \sqrt{1 + \cos x} dx$ cannot possibly be 2.
7. (a) Define Riemann sum.
 (b) Find the average value of $f(x) = 4 - x^2$ on $[0,3]$.

Section C

(Answer any 1 Question, each question carries 10 marks)

8. Find $\frac{dy}{dx}$ if $y = \frac{(x^2+1)(x+3)^{\frac{1}{2}}}{x-1}$; $x > 1$.
9. (a) $\int_{\frac{\pi}{2}}^0 \left(2 + \tan \frac{t}{2}\right) \sec^2 \frac{t}{2} dt$
 (b) $\int_0^1 \frac{x^3 dx}{\sqrt{x^4+9}}$