

**INDIAN SCHOOL MUSCAT**

**HALF YEARLY EXAMINATION**  
**SEPTEMBER 2019**

**SET A**

**CLASS XII**

**Marking Scheme – SUBJECT [THEORY]**

Q.NO.	Answers	Marks (with split up)
1.	20	1
2.	$5\pi/6$	1
3.	$13\pi/12$	1
4.	4 sq.units	1
5.	$x \log x - x + c$	1
6.	-1	1
7.	0	1
8.	$\tan x - x + c$	1
9.	$1/2$	1
10.	Critical point	1
11.	d) $1/2$	1
12.	0	1
13.	C	1
14.	C	1
15.	D	1
16.	D	1
17.	A	1
18.	B	1
19.	C	1
20.	B	1
21.	$\tan^{-1} \left[ \frac{\frac{1}{2} + \frac{2}{11}}{1 - \frac{1}{2} \times \frac{2}{11}} \right]$ $\tan^{-1}(3/4)$	1 1
22.	LHS = RHS = f(1) K = -5	1 1
23.	$y = \sin^{-1} \left( \frac{1-x^2}{1+x^2} \right)$ $= \pi/2 - \cos^{-1} \left( \frac{1-x^2}{1+x^2} \right)$ $= \pi/2 - 2\tan^{-1} x$	
24.	$\int_1^3 7x \, dx + \int_3^4 8 \, dx$ $\frac{7x^2}{2} + \frac{8x}{2} \text{ with limit values} = 36$	1 + 1

25.	Find $dc/dx$ Substitute $x = 17$ . Ans 20.967	1 1
26.	LCM (OR) Conjugate & Simplification $-2\sqrt{a^2 - x^2} + c$	1 1
27.	Take conjugate or substitution Put $x^2 = \sin \alpha$ $\pi/2 - \frac{1}{2} \sin^{-1}(x^2)$	1 1 1+1
28.	Case 1: Even, one one & onto Case 2: Odd, one one & onto	2 2
29.	$f(x) = \frac{3}{10}x^4 - \frac{4}{5}x^3 - 3x^2 + \frac{36}{5}x + 11$ $f'(x) = \frac{6}{5}(x-1)(x+2)(x-3)$ Intervals: $(-\infty, -2)$ , $(-2, 1)$ , $(1, 3)$ , $(3, \infty)$ Decr      Incr      Decr      Incr	1 1 1 1
	OR CUTS AT $X = 7$ $Dy/dx$ at $x = 0$ is $= 1/20$ Tangent $20y - x + 7 = 0$ Normal $20x + y - 14 = 0$	1 1 1 1
30.	$\frac{du}{dx} = \sin x^{\cos x} (\cot x \cos x - \sin x \log \sin x)$ $\frac{dv}{dx} = x^{\sin x} \left( \frac{\sin x}{x} + \log x \cdot \cos x \right)$ $\frac{dy}{dx} = \sin x^{\cos x} (\cot x \cos x - \sin x \log \sin x) + x^{\sin x} \left( \frac{\sin x}{x} + \log x \cdot \cos x \right)$	2 1.5 1/2
31.	LHL=RHL $a - b = -2$ LHD = RHD $b = 5$ $a = 3$	1.5 1.5 ½ 1
32.	$x + 2 = A(4x+6) + B$ $A = \frac{1}{4}$ $B = \frac{1}{2}$ $\frac{1}{4} \log 2x^2 + 6x + 5  + 1/2 \tan^{-1}(2x + 3) + c$	1/2 1 1+1.5
33.	Reflexive Symmetric Transitive Equivalence Relation	1 2 2 1
34.	Figure Point of intersection $(1, \sqrt{3})$ $\text{Area} = 4 \int_0^1 \sqrt{4 - (x-2)^2} dx$ Expansion with formula	1 1 2 1

$\frac{8\pi}{3} - 2\sqrt{3}$ sq.units OR figure AB-----y = 2(x-1) BC-----y = 4-x AC-----y = $\frac{1}{2}(x - 1)$ AB+ BC- AC Integrate with correct limits(AB)1 to 2 : (BC) 2 to 3 : (AC) 1 to 3 $= 2x\frac{1}{2} + 3/2 - \frac{1}{2}x^2 = 3/2$ Square units	1 1 1.5 1 1.5 $\frac{1}{2}+1/2$
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35.	$\int \sqrt{\tan x} + \sqrt{\cot x} dx$ (TB solved) Let $\tan x = t^2 \rightarrow dx = \frac{2t dt}{1+t^4}$ $= 2 \int \frac{t^2+1}{t^4+1} dt$ Divide by $t^2$ method Substitution by u $\sqrt{2} \tan^{-1} \frac{\tan x - 1}{\sqrt{2} \tan x} + c$	1.5 1 1.5 1 1
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36.	$V = \frac{1}{3}\pi r^2 h$ -----1 figure $l^2 = r^2 + \frac{9v^2}{\pi^2 r^4}$ $S = \pi^2 r^2 \left(r^2 + \frac{9v^2}{\pi^2 r^4}\right)$ $s' = 4\pi^2 r^3 - \frac{18v^2}{r^3}$ For minimum, $s' = 0 \rightarrow v^2 = \frac{2}{9}\pi^2 r^6$ -----2 $s'' = 12\pi^2 r^2 + \frac{54v^2}{r^4} > 0$ is minimum From 1 and 2 $h = \sqrt{2}$	1/2 1 1 1 1/2 1 1
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	B				C				
1	4	11	A	1	2		11	A	
2	xlo x - x + c	12	D	2	x log x <sup>2</sup> - 2x + c		12	D	
3	$13\pi/12$	13	C	3	$13\pi/12$		13	C	
4	20	14	C	4	20		14	C	
5	$3\pi/4$	15	D	5	$2\pi/3$		15	D	
6	-1	16	D	6	-1		16	D	
7	tan x - x + c	17	D	7	-cot x - x + c		17	D	
8	0	18	B	8	0		18	B	
9	$9/2$	19	C	9	2		19	C	
10	Critical pt	20	B	10	Critical pt		20	B	

Type equation here.

27	$\frac{du}{dx} = \cos x^{\sin x} (-\sin x \tan x - \cos x \log \cos x)$	
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28	$x = \cos 2\theta$ $\frac{\pi}{4} - \frac{1}{2}\cos^{-1} x$	
32	Linear/ quadratic $A = 5/6 \quad B = -11/3$ $\frac{5}{6} \log 3x^2 + 2x + 1  - \frac{11}{3\sqrt{2}} \tan^{-1} \frac{3x+1}{\sqrt{2}} + c$	
35	TB EXAMPLE $\int_{-1}^1 x \sin(\pi x) dx + \int_1^{3/2} -x \sin(\pi x) dx$ $\left( \frac{-x \cos \pi x}{\pi} + \frac{\sin \pi x}{\pi} \right) - \left( \frac{-x \cos \pi x}{\pi} + \frac{\sin \pi x}{\pi^2} \right)$ $\frac{3}{\pi} + \frac{1}{\pi^2}$ <p style="text-align: center;">C</p>	
1	2	
2	$x \log x^2 - 2x + c$	
5	2 $\pi/3$	
7	$-\cot x - x + c$	
9	2 sq.units	
30	Linear/quadratic $A = 1/2 \quad B = 4$ $\log \sqrt{x^2 - 2x - 5}  + \frac{2}{\sqrt{6}} \log \left  \frac{x-1-\sqrt{6}}{x-1+\sqrt{6}} \right  + c$	
35	$t = \sin x - \cos x$ $t^2 = 1 - \sin 2x$ $dt = (\cos x + \sin x) dx$ $\int_{-1}^0 \frac{dt}{25 - 16t^2}$ $\frac{1}{16} \frac{1}{2 \cdot \frac{5}{4}} \log \left  \frac{\frac{5}{4} + t}{\frac{5}{4} - t} \right $ $\frac{1}{20} \log 3$	2 2 2