Department of Mathematics

King Saud University

M-106

FINAL EXAM

First Term (1426/1427)

Max. Marks: 50 Time: Three Hours

Name:............................ Number:................

Name of Teacher...............Group No:...........

Marks:

Multiple Choice:(1-to-16).....[ ]

Question(17)............... [ ]

Question(18)...................[ ]

Question(19)...............[ ]

Question(20)...............[ ]

Question(21)...............[ ]

Question(22)...............[ ]

Total:......................................[ ]

Multiple Choices

Mark $\{a, b, c, d\}$ for the correct answers in the space given below for **Q.1-to-Q.16**

[16×1.5 = 24]

Q. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Select from{a,b,c,d}																

Q.No:1 If $F(x) = \int_1^{x^2} \frac{1}{t}\, dt$, then $F'(2)$ is equal to:

(a) -1 (b) 1 (c) 4 (d) None of these

Q.No: 2 If $S = \sum_{k=1}^{4} k(k^2 - 1)$, then S is equal to:

(a) 100, (b) 90, (c) 45, (d) None of these

Q.No:3 If $x = (5)^y$ then y' is equal to

(a) $\frac{\ln(5)}{x}$ (b) $\frac{x}{\ln(5)}$ (c) $\frac{\ln(5)}{x}$ (d) None of these

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Q.No:4 $\int (Tan^2x - Sec^2x)\, dx$ is equal to

(a) $\frac{Tan^3x}{3} - \frac{Sec^3x}{3} + c$, (b) $-x + c$, (c) $-\frac{(\ln Cosx)^3}{3} - Tanx + c$, (d) None of these

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Q.No:5 The best substitution to evaluate the integral $\int \frac{e^x}{\sqrt{4\, e^{2x} + 9}}\, dx$ is

(a) $u = 2\, e^x$, (b) $u = 3\, e^x$, (c) $u = \frac{2}{3}\, e^x$, (d) None of these.

Q.No:6 The value of the integral $\int Tan^4x Sec^2x\, dx$ is equal to

(a) $\frac{Sec^5x}{5} - \frac{Sec^3x}{3} + c$, (b) $\frac{1}{5}Tan^5x + c$, (c) $\frac{Sec^3x}{3} + \frac{Tan^5x}{5} + c$, (d) None of these

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Q.No:7 If $\int_2^8 f(x)\, dx = (8 - \pi)^5 - (2 - \pi)^5$ then $f(x)$ is equal to

(a) $5(x - \pi)^4 + c$, (b) $5(x - \pi)^4$, (c) $\frac{(x - \pi)^6}{6}$, (d) None of these

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Q.No:8 $\lim_{x \to \infty} \frac{x + e^x}{1 + e^{3x}}$ is equal to

(a) ∞ , (b) 1 , (c) 0 , (d) None of these

Q.No:9 The value of the integral $\int_{-1}^{0} \frac{1}{x}\,dx$ is equal to

(*a*) 0, (b) $-\infty$, (c) ∞, (d) None of these

Q.No: 10 The range of the function $f(x) = Cosh(x)$ is:
(*a*) $(-\infty,\infty)$, (b) $[0,\infty)$, (c) $[1,\infty)$, (d) None of these.

Q.No: 11 If a point has $(r,\theta) = (2, \frac{\pi}{6})$ then its (x,y) coordinates are

(*a*) $(-\sqrt{3},-1)$, (*b*) $(-\sqrt{3},1)$, (c) $(\sqrt{3},1)$, (d) None of these.

Q.No: 12 If a point P has one $(r,\theta) = (2, \frac{\pi}{2})$ then its another (r,θ) coordinates are
(*a*) $(-2,-\frac{\pi}{2})$, (*b*) $(-2,-\frac{\pi}{2}+\pi)$, (c) $(2,\frac{\pi}{2}+\pi)$, (d) None of these

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Q.No: 13 If we revolve the graph of curve $y = t, x = t$ $, 0 \le t \le 2$ arround the

$x - axis$ the **area of the surface** generated is equal to:

(*a*) $2\sqrt{2}\pi$, (b) $4\sqrt{2}$, (c) $4\sqrt{2}\pi$, (*d*) None of these

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Q.No:14 The graphs of equations $y = x^2$ and $y = 3 - 2x$ intersect in the points

(*a*) $(3,9)\&(-1,1)$, (b) $(-3,9)\&(1,1)$, (c) $(-3,-3)\&(1,-1)$, (*d*) None of these

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Q.No: 15 The parametric equations $x = 2Cos\,t, y = 2\,Sin\,t$ represents a:

(a) Ellipse, (b) Circle, (c) Hyperbola, (d) None of these.

Q.No: 16 The point at which the curve $x = 3Cos\,t, y = 3\,Sin\,t;\ 0 \le t \le \frac{\pi}{2}$
has **horizotal** tangent line is:

(*a*) $(0,3)$, (*b*) $(3,3)$, (c) $(3,0)$, (d) None of these

Question No: **17** Approximate the integral $\int_{0}^{8} 2^{-x} dx$ using the **Simpsons** rule **[6]**

for $n = 4$.

Question No: **18** Evaluate the integral $\int \frac{x^{1/6}}{x^{1/3} + 1}\, dx$ **[4]**

Question No: **19** Evaluate the improper integral $\int_{1}^{e} \frac{1}{x\sqrt{\ln x}}\,dx$ [**4**]

Question No: **20** Evaluate the integral $\int \frac{1}{x^2 - 3x + 2}\,dx$ [**4**]

Question No: 21 Find the area of the region R that lies inside the circle $r = 1$, and outside the cardiod $r = 1 - Cos\,\theta$. **[4]**

Question No: 22 Find the **volume** of the solid **generated by revolving** the region **R** bounded by the graphs of the equations $y = \sqrt{x}$, $y = x^2$ **about the** $x - axis$. [4]