(39) In the law of mean, the value of 'θ' satisfies the condition

(1) $\theta > 0$ (2) $\theta < 0$ (3) $\theta < 1$ (4) $0 < \theta < 1$

(40) Which of the following statements are correct?

(a) Rolle's theorem is a particular case of Lagranges law of mean

(b) Lagranges law of mean is a particular case of generalised law of mean (Cauchy)

(c) Lagranges law of mean is a particular case of Rolle's theorem

(d) Generalised law of mean is a particular case of Lagranges law of mean(Cauchy)

(1) (b), (c) (2) (c), (d) (3) (a), (b) (4) (a), (d)

CHAPTER VI

(1) For the function $y = x^3 + 2x^2$ the value of dy when $x = 2$ and $dx = 0.1$ is

(1) 1 (2) 2 (3) 3 (4) 4

(2) If $U = x^4 + y^3 + 3x^2y^2 + 3x^2y$ then $\dfrac{\partial u}{\partial x}$ is

(1) $4x^3 + 6xy^2 + 6xy$ (2) $3x^4 + 6x^2y + 3xy^2$

(3) $4x^3 - 6x^2y + 6xy^2$ (4) $4x^3 + 6x^2y^2 + 3xy$

(3) If $u = f(x, y)$ then with usual notations, $u_{xy} = u_{yx}$ if

(1) u is continuous (2) u_x is continuous

(3) u_y is continuous (4) u, u_x, u_y are continuous

(4) If $u = f(x, y)$ is a differentiable function of x and y ; x and y are differentiable functions of t then

(1) $\dfrac{du}{dt} = \dfrac{\partial f}{\partial x}\cdot\dfrac{\partial x}{\partial t} + \dfrac{\partial f}{\partial y}\cdot\dfrac{\partial y}{\partial t}$ (2) $\dfrac{du}{dt} = \dfrac{\partial f}{\partial x}\cdot\dfrac{dx}{dt} + \dfrac{\partial t}{\partial y}\cdot\dfrac{\partial y}{\partial t}$

(3) $\dfrac{du}{dt} = \dfrac{\partial f}{\partial x}\cdot\dfrac{dx}{dt} + \dfrac{\partial f}{\partial y}\cdot\dfrac{dy}{dt}$ (4) $\dfrac{\partial u}{\partial t} = \dfrac{\partial f}{\partial x}\cdot\dfrac{\partial x}{\partial t} + \dfrac{\partial f}{\partial y}\cdot\dfrac{\partial y}{\partial t}$

(5) If $f(x, y)$ is a homogeneous functions of degree n then $x\dfrac{\partial f}{\partial x} + y\dfrac{\partial f}{\partial y} =$

(1) f (2) nf (3) $n(n-1)f$ (4) $n(n+1)f$

(6) If $u(x, y) = x^4 + y^3 + 3x^2y^2 + 3x^2y$ then $\dfrac{\partial^2 u}{\partial x\,\partial y}$ is

(1) $12xy + 6x$ (2) $12xy - 6x$ (3) $12x^2y - 6x$ (4) $12xy^2 - 6x$

(7) If $u(x, y) = x^4 + y^3 + 3x^2y^2 + 3x^2y$ then $\frac{\partial^2 u}{\partial y \partial x} =$

(1) $12xy + 6x$ (2) $12xy - 6x$ (3) $12x^2y - 6x$ (4) $12x$

(8) If $u(x, y) = x^4 + y^3 + 3x^2y^2 + 3x^2y$ then $\frac{\partial^2 u}{\partial x^2} =$

(1) $3y^2 + 6x^2y + 3x^2$ (2) $6y + 6x^2$

(3) $12x^2y - 6x$ (4) $12x^2 + 6y^2 + 6y$

(9) If $u(x, y) = x^4 + y^3 + 3x^2y^2 + 3x^2y$ then $\frac{\partial^2 u}{\partial y^2} =$

(1) $6y + 6x^2$ (2) $12xy - 6x$

(3) $12x^2y - 6x$ (4) $3y^2 + 6x^2y + 3x^2$

(10) The differential on y of the function $y = \sqrt[4]{x}$ is

(1) $\frac{1}{4}x^{-3/4}$ (2) $\frac{1}{4}x^{-3/4}dx$ (3) $x^{-3/4}dx$ (4) 0

(11) The differential of y if $y = x^5$ is,

(1) $5x^4$ (2) $5x^4dx$ (3) $5x^5dx$ (4) $5x^5$

(12) The differential of y if $y = \sqrt{x^4 + x^2 + 1}$

(1) $\frac{1}{2}(4x^3 + 2x)^{-\frac{1}{2}}dx$ (2) $\frac{1}{2}(x^4 + x^2 + 1)^{-\frac{1}{2}}(4x^3 + 2x)dx$

(3) $\frac{1}{2}(4x^3 + 2x)^{-\frac{1}{2}}$ (4) $\frac{1}{2}(x^4 + x^2 + 1)^{-\frac{1}{2}}(4x^3 + 2x)$

(13) The differential of y if $y = \frac{x - 2}{2x + 3}$ is

(1) $\frac{-7}{(2x + 3)^2}dx$ (2) $\frac{1}{(2x + 3)^2}dx$

(3) $\frac{7}{(2x + 3)^2}dx$ (4) $\frac{7}{(2x + 3)^2}$

(14) The differential of y if $y = \sin 2x$ is

(1) $2\cos 2x.$ (2) $2\cos 2x.dx$

(3) $-2\cos 2x.dx$ (4) $\cos 2x.dx$

(15) The differential of $x\tan x$ is

(1) $(x\sec^2 x + \tan^2 x)$ (2) $(x\sec^2 x - \tan x)dx$

(3) $x\sec^2 x dx$ (4) $(x\sec^2 x + \tan x)dx$

(16) If $u(x, y) = x^4 + y^3 + 3x^2y^2 + 3x^2y$ then $\frac{\partial u}{\partial y}$ is

(1) $3y^2 + 6xy + 3x^2$ (2) $3y^2 + 6xy^2 + 3x^2$

(3) $3y^2 + 6x^2y + 3x^2$ (4) $3y^2 + 6x^2y^2 + 3x^2$

(17) The curve $y^2 = x^2(1 - x^2)$ is defined only for

(1) $x \leq 2$ and $x \geq -2$ (2) $x \leq 1$ and $x \geq -1$

(3) $x \leq -1$ and $x \geq 1$ (4) $x < 1$ and $x > -1$

(18) The curve $y^2 = x^2 (1 - x^2)$ is symmetrical about

(1) x-axis only (2) y-axis only

(3) x and y axes only (4) x, y axes and the origin

(19) The curve $y^2 = x^2 (1 - x^2)$ has

(1) only one loop between $x = 0$ and $x = 1$

(2) two loops between $x = -1$ and $x = 0$

(3) two loops between $x = -1$ and 0 ; 0 and 1

(4) no loop

(20) The curve $y^2 = x^2 (1 - x^2)$ has

(1) an asymptote $x = -1$ (2) an asymptote $x = 1$

(3) two asymptotes $x = 1$ and $x = -1$ (4) no asymptote

(21) The curve $y^2 (2 + x) = x^2(6 - x)$ exists for

(1) $-2 < x \leq 6$ (2) $-2 \leq x \leq 6$ (3) $-2 < x < 6$ (4) $-2 \leq x < 6$

(22) The x-intercept of the curve $y^2 (2 + x) = x^2 (6 - x)$ is

(1) 0 (2) 6, 0 (3) 2 (4) -2

(23) The asymptote to the curve $y^2 (2 + x) = x^2 (6 - x)$ is

(1) $x = 2$ (2) $x = -2$ (3) $x = 6$ (4) $x = -6$

(24) The curve $y^2 (2 + x) = x^2 (6 - x)$ has

(1) only one loop between $x = 0$ and $x = 6$

(2) two loops between $x = 0$ and $x = 6$

(3) only one loop between $x = -2$ and $x = 6$

(4) two loops between $x = -2$ and $x = 6$

(25) The curve $y^2 = x^2 (1 - x)$ is defined only for

(1) $x \leq 1$ (2) $x \geq 1$ (3) $x < 1$ (4) $x > 1$

(26) The curve $y^2 = x^2(1 - x)$ is symmetrical about

(1) y-axis only (2) x-axis only (3) both the axes (4) origin only

(27) The curve $y^2 = x^2(1-x)$ has

(1) an asymptote $y = 0$ (2) an asymptote $x = 1$

(3) an asymptote $y = 1$ (4) no asymptote

(28) The curve $y^2 = x^2(1-x)$ has

(1) only one loop between $x = -1$ and $x = 0$

(2) only one loop between $x = 0$ and $x = 1$

(3) two loops between $x = -1$ and $x = 1$

(4) no loop

(29) The curve $y^2 = (x-a)(x-b)^2$, $a, b > 0$ and $a > b$ does not exist for

(1) $x \geq a$ (2) $x = b$ (3) $b < x < a$ (4) $x = a$

(30) The curve $y^2 = (x-a)(x-b)^2$ is symmetrical about

(1) origin only (2) y-axis only

(3) x-axis only (4) both x and y-axis

(31) The curve $y^2 = (x-a)(x-b)^2$ has $a, b > 0$ and $a > b$

(1) an asymptote $x = a$ (2) an asymptote $x = b$

(3) an asymptote $y = a$ (4) no asymptote

(32) The curve $y^2 = (x-a)(x-b)^2$, $a, b > 0$ and $a > b$ has

(1) a loop between $x = a$ and $x = b$

(2) two loops between $x = a$ and $x = b$

(3) two loops between $x = 0$ and $x = a$

(4) no loop

(33) The curve $y^2(1+x) = x^2(1-x)$ is defined for

(1) $-1 \leq x \leq 1$ (2) $-1 < x \leq 1$ (3) $-1 \leq x < 1$ (4) $-1 < x < 1$

(34) The curve $y^2(1+x) = x^2(1-x)$ is symmetrical about

(1) both the axes (2) origin only (3) y-axis only (4) x-axis only

(35) The asymptote to the curve $y^2(1+x) = x^2(1-x)$ is

(1) $x = 1$ (2) $y = 1$ (3) $y = -1$ (4) $x = -1$

(36) The curve $y^2(1+x) = x^2(1-x)$ has

(1) a loop between $x = -1$ and $x = 1$

(2) a loop between $x = -1$ and $x = 0$

(3) a loop between $x = 0$ and $x = 1$

(4) no loop

(37) The curve $a^2y^2 = x^2(a^2 - x^2)$ is defined for

(1) $x \leq a$ and $x \geq -a$ (2) $x < a$ and $x > -a$

(3) $x \leq -a$ and $x \geq a$ (4) $x \leq a$ and $x > -a$

(38) The curve $a^2y^2 = x^2(a^2 - x^2)$ is symmetrical about

(1) x-axis only (2) y-axis only

(3) both the axes (4) both the axes and origin

(39) The curve $a^2y^2 = x^2(a^2 - x^2)$ has

(1) an asymptote $x = a$ (2) an asymptote $x = -a$

(3) an asymptote $x = 0$ (4) no asymptote

(40) The curve $a^2y^2 = x^2(a^2 - x^2)$ has

(1) a loop between $x = a$ and $x = -a$

(2) two loops between $x = -a$ and $x = 0$; $x = 0$ and $x = a$

(3) two loops between $x = 0$ and $x = a$

(4) no loop

(41) The curve $y^2 = (x - 1)(x - 2)^2$ is not defined for

(1) $x \geq 1$ (2) $x \geq 2$ (3) $x < 2$ (4) $x < 1$

(42) The curve $y^2 = (x - 1)(x - 2)^2$ is symmetrical about

(1) both x and y-axis (2) x-axis only

(3) y-axis only (4) both the axes and origin

(43) The curve $y^2 = (x - 1)(x - 2)^2$ has

(1) an asymptote $x = 1$ (2) an asymptote $x = 2$

(3) two asymptotes $x = 1$ and $x = 2$ (4) no asymptote

(44) The curve $y^2 = (x - 1)(x - 2)^2$ has

(1) two loops between $x = 0$ and $x = 2$

(2) one loop between $x = 0$ and $x = 1$

(3) one loop between $x = 1$ and $x = 2$

(4) no loop

CHAPTER VII

(1) If $I_n = \int \sin^n x dx$ then $I_n =$

(1) $-\frac{1}{n}\sin^{n-1}x\cos x + \frac{n-1}{n} I_{n-2}$

(2) $\frac{1}{n}\sin^{n-1}x\cos x + \frac{n-1}{n} I_{n-2}$

(3) $-\frac{1}{n}\sin^{n-1}x\cos x - \frac{n-1}{n} I_{n-2}$

(4) $-\frac{1}{n}\sin^{n-1}x\cos x + \frac{n-1}{n} I_n$

(2) $\int_0^{2a} f(x)\,dx = 2\int_0^{a} f(x)\,dx$ if

(1) $f(2a - x) = f(x)$ (2) $f(a - x) = f(x)$

(3) $f(x) = -f(x)$ (3) $f(-x) = f(x)$