

HERAMB COACHING CLASSES

Yogeshwar Towers, Katemanivali, Kalyan (East)

Date: 14/10/2018

XII/MATHEMATICS**Marks: 40****Duration: 1.30Hours****Q.1 Examine the continuity: (Any 3)****(15m)**

$$1) f(x) = x^2 - x + 9, \text{ for } x \leq 3$$

$$= 4x + 3, \quad \text{for } x > 3; \text{ at } x = 3.$$

$$2) f(x) = \frac{x^2-16}{x-4}, \text{ for } x \neq 4$$

$$= 8, \quad \text{for } x = 4; \text{ at } x = 4.$$

$$3) f(x) = \frac{\sin 5x}{x}, \text{ for } x \neq 0$$

$$= 1, \quad \text{for } x = 0; \text{ at } x = 0.$$

$$4) f(x) = x^2 \cos\left(\frac{1}{x}\right), \text{ for } x \neq 0$$

$$= 0, \quad \text{for } x = 0; \text{ at } x = 0.$$

$$5) f(x) = \frac{6^x+3^x-2^x-1}{x}, \text{ for } x < 0$$

$$= \frac{4^x+4^{-x}-2}{x^2}, \text{ for } x \geq 0; \text{ at } x = 0.$$

Q.2 Discuss the continuity of the following functions: (Any2)**(10m)**

$$1) f(x) = \frac{a^{2x}-1}{x}, \quad x \neq 0, a > 0 \text{ and } a \neq 1$$

$$= 2 \log a, \quad x = 0; \text{ at } x = 0.$$

$$2) f(x) = \frac{5^x-3^x}{4^x-3^x}, \quad x \neq 0$$

$$= \log\left(\frac{5}{4}\right), \quad x = 0; \text{ at } x = 0.$$

$$3) g(x) = \left(1 + \frac{5x}{2}\right)^{\frac{2}{x}}, x \neq 0$$

$$= e^{\frac{5}{2}}, \quad x = 0; \text{ at } x = 0.$$

Q.3 Attempt any 3:**(15m)**

$$1) \text{ If } f(x) = \frac{1-\sin x}{(\pi-2x)^2}, \text{ for } x \neq \frac{\pi}{2}, \text{ is continuous at } x = \frac{\pi}{2}, \text{ then find } f\left(\frac{\pi}{2}\right).$$

$$2) \text{ If } f(x) = \frac{e^{2x}-1}{ax} \quad \text{for } x < 0, a \neq 0$$

$$= 1 \quad \text{for } x = 0$$

$$= \frac{\log(1+7x)}{bx} \quad \text{for } x > 0, b \neq 0$$

Is continuous at $x = 0$, then find a and b.

$$3) \text{ If } f \text{ is continuous at } x = 0 \text{ and}$$

$$f(x) = 2\sqrt{x^3+1} + a, \text{ for } x < 0$$

$$= x^3 + a + b, \quad \text{for } x \geq 0$$

And $f(1) = 2$, then find a, b.

