P.S SCIENCE & H.D. PATEL ARTS COLLAGE, KADI

Internal examination

Set - A | **B.sc SEM- III** | [Marks :40]

[Dt: 10 - 9 - 2017] | **Mathematics – CCMATH -301** | **[1:45 to 3:45]**

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1 Attempt any two.

a) Define limit of a function of two variables.

Evaluate the following limit by definition if exist

$$\lim_{(x,y)\to(2,1)} \frac{2x+y}{3y-x}$$

b) Evaluate the following limit, if exist

$$\lim_{(x,y)\to(2,1)} f(x, y)$$

Where $f(x, y) = tan^{-1}(y/x)$ $x \neq 0, y \neq 0$

$= 3$ oterwice

c) Discuss the continuity of the following function at mentioned point

$$f(x, y) = \frac{x^2-y^2}{x+y} \quad x \neq 0, y \neq 0$$

$= 0$ Oterwice at (0, 0)

2 Attempt any two.

a) State only Young's theorem

If $u = x \log y + y \log x$, then P. T. $u_{xy} = u_{yx}$

b) If $H = f(y-z, z-x, x-y)$ then P. T. $H_x + H_y + H_z = 0$

c) If $u = f(r)$, $r^2 = x^2 + y^2 + z^2$ then P. T.

$$u_{xx} + u_{yy} + u_{zz} = f''(r) + \frac{2}{r}(f'(r))$$

3 Attempt any two.

a) Define Homogeneous function with illustration.

b) If $u = \cos^{-1}\left(\frac{x^2-y^2}{x+y}\right)$, $x+y \neq 0$ then P. T. $x u_x + y u_y = -\cot u$

c) If $u = \tan^{-1}\left(\frac{x3+y3}{x-y}\right)$, then P. T. $x u_x + y u_y = \sin 2u$

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