



Ministry of Higher Education and Scientific Research
University of Babylon /College of Material's Engineering
Dept. of Eng. of Polymers and Petrochemical Industries
Second month Examination (2016-2017)



Sub.: Mathematics I

Date: / 1/2017

Stage: Second

Time:1.5Hrs.

Questions carry equal marks

Q1)

A. Find i) w_{xx} for $w=x^2 \tan(xy)$ ii) w_{yy} for $w= x \sin(x^2y)$

B. Find the area of the region . Shared by the circles $r = 1$ and $r = 2 \sin \theta$

$$\pi/6 \leq \theta \leq 5\pi/6$$

Q2)

A. Replace the polar equations with equivalent Cartesian equation.

$$r = \frac{5}{\sin \theta - 2 \cos \theta}$$

B. Find the length of the curve $r = a \sin^2 \left(\frac{\theta}{2} \right)$, $0 \leq \theta \leq \pi$, $a > 0$

Q3)

A. Graph the lemniscate $r^2 = -\cos 2\theta$

B. Show that function satisfies $\frac{\partial^2 f}{\partial x^2} + \frac{\partial^2 f}{\partial y^2} = 0$

$$f(x,y) = e^{-2y} \cos 2x$$

C. (a) Express dw/dt as a function of t , both by using the Chain Rule and by expressing w in terms of t and differentiating directly with respect to t . Then (b) Evaluate dw/dt at the given value of t

$$w = \frac{x}{z} + \frac{y}{z} , \quad x = \cos^2 t , \quad y = \sin^2 t , \quad z = \frac{1}{t} , \quad t = 3$$

Good luck

Head of the Department:
Assist. Prof. Dr. Nazzar .J.Hadi

Examiner:
Mr.Qusai A.M