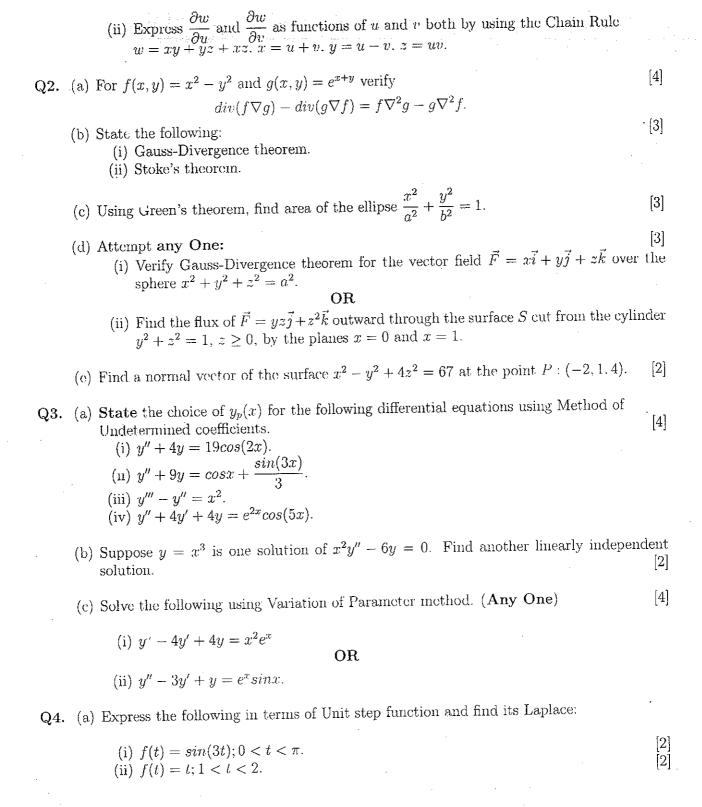
COLLEGE OF ENGINEERING, PUNE (An Autonomous Institute of Government of Maharashtra.)

END Semester Exam

(MA-16006) Multivariate Calculus and Differential Equations

Course: S.Y.B.Tech , Semester IV Academic Year: 2017-2018 Duration: 3 Hours Branches: All		k.Marks:60 e: 03/05/2018
Instructions:	Student MIS NO.:	
 All questions are compulsory. Figures to the right indicate the full man Mobile phones and programmable calcul Writing anything on question paper is not Exchange/Sharing of stationery, calculat Write your MIS Number on Question Pa 	ators are strictly prohibited. ot allowed. or etc. not allowed.	•
Attempt the following questions:		e e e e e e e e e e e e e e e e e e e
Q1. (a) Find t' e value of $\frac{\partial z}{\partial x}$ at the point (implicitly as a function of the two in	$1,1,1$) if the equation $xy + z^3x - 2yz = 0$ ondependent variables x and y .	lefines z [4]
(b) Use the transformation $u = x + 2y$, $\int_0^{2/3} \int_y^{2-2y} (x^2 + y^2) dx$	$v = x - y$ to evaluate the integral $(x + 2y)e^{(y-x)}axdy$	[5]
by first writing it is an integral over	a region G in the uv -plane.	
(c) Evaluate $\int_0^{\pi/2} \int_0^{\pi} \int_0^{2\sin\theta} d\theta d\theta$	$ ho^2 \sin^2 \phi d ho d\phi d heta.$	[3]
 (d) Attempt any One: (i) Define the following terms: (A) Interior point (B) Boundary point (C) Open Set 		[3]



[2]

(i) y'' + 3y' + 2y = r(t) where r(t) = 1, if 0 < t < 1 and r(t) = 0, if t > 1 and y(0) = 0, y'(0) = 0.

or

- (ii) y'' + y = r(t) where r(t) = t, if 0 < t < 1 and r(t) = 0, if t > 1 and y(0) = 0, y'(0) = 0.
- (c) Is it true that Laplace of product of 2 fuctions is equal to product of laplaces? Justify! [2]

Q6. (a) Solve: [3]

 $y'' + 2y' + 2y = 5\delta(t - 2), y(0) = 0, y'(0) = 1$

- (b) Attempt any One:
 - (i) Find laplace of $f(t) = 1, 0 \le t < 2$ and $f(t) = -1, 2 \le 2 \le 4$ and f(t+4) = f(t).
 - (ii) Solve using convolution theorem:

y'' + y = sint, y(0) = 0, y'(0) = 0

(c) State the standard assumptions and derive the one-dimensional wave equation which governs the transverse vibrations of an elastic string of Length L. [5]

** Good Luck **

