reated as malpractice



MATDIP301

Third Semester B.E. Degree Examination, June 2012

Advanced Mathematics - I

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

1 a. Express
$$z = \frac{2 - \sqrt{3}i}{1 + i}$$
 in the form $a + ib$. (06 Marks)

b. Find modulus and amplitude of
$$z = \frac{3+i}{2+i}$$
. (07 Marks)

c. Find all the values of
$$z = \left(\frac{1}{2} + i\frac{\sqrt{3}}{2}\right)^{\frac{3}{4}}$$
. (07 Marks)

2 a. Find the nth derivative of
$$y = e^{ax} \cos(bx + c)$$
. (06 Marks)

b. If
$$y = \sin(m \sin^{-1} x)$$
 prove that $(1 - x^2)y_{n+2} - (2n+1)xy_{n+1} + (m^2 - n^2)y_n = 0$. (07 Marks)

c. Expand
$$y = log(1 + x)$$
 in Maclaurins series upto 5th term. (07 Marks)

3 a. If
$$u = \frac{x^2 y^2}{x + y}$$
, find the value of $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2}$. (06 Marks)

b. If
$$u = 3x^2 + y^2$$
 and $x^2 - y^2 = 1$, find $\frac{du}{dx}$ (07 Marks)

c. If
$$x = r \cos \phi$$
, $y = r \sin \phi$, $z = z$, find $\frac{\partial(x, y, z)}{\partial(r, \phi, z)}$. (07 Marks)

4 a. Obtain the reduction formula for
$$\int_{0}^{\frac{\pi}{2}} \sin^{n} x \, dx$$
 and hence obtain $\int_{0}^{\frac{\pi}{2}} \sin^{4} x \, dx$. (06 Marks)

b. Evaluate
$$\int x^2 (1-x^2)^{1/2} dx$$
. (07 Marks)

c. Evaluate
$$\iint x^3 y^3 dx dy$$
. (07 Marks)

5 a. Evaluate
$$\iiint (x+y+z)dz dy dx$$
. (06 Marks)

b. Evaluate
$$\int x^2 e^{-4x} dx$$
 using gamma function. (07 Marks)

c. Find
$$\beta\left(\frac{5}{2}, \frac{3}{2}\right)$$
 in terms of gamma function.. (07 Marks)

Important Note: 1. On completing your answers, computing draw diagonal cross lines on the remaining blank page 2. Any revealing of identification, appear to evaluator and for equations written eg. 42+8 = 50, will be

1 of 2

DOWNLOAD THIS FREE AT

www.vturesource.com

MATDIP301

6 a. Solve the equation $\sqrt{1-y^2} dx + \sqrt{1-x^2} dy = 0$.

b. Solve
$$\frac{dy}{dx} = \frac{x - y}{x + y}$$
.

c. Solve
$$\frac{dy}{dx} = (x + y)^2$$
.

7 a. Solve
$$\frac{dy}{dx} = \frac{\sin 2x - \tan y}{x \sec^2 y}$$
.

b. Solve
$$\frac{d^2y}{dx^2} + x^2y = x^2$$
.

c. Solve
$$\frac{dy}{dx} + \sin xy = \sin x \cos x$$
.

8 a. Solve
$$(D^2 + a^2)y = x^2$$
.
b. Solve $(D^3 + D^2 - D - 1)y = e^{2x}$.
c. Solve $(D^4 - 1)y = \sin x + 2$.

b. Solve
$$(D^4 + D^2 - D - 1)y = e$$

c. Solve $(D^4 - 1)y = \sin x + 2$

(06 Marks)

(07 Marks)

(07 Marks)

(06 Marks)

(07 Marks)

(07 Marks)

(06 Marks)

(07 Marks)

(07 Marks)