CBCS SCHEME

15MATDIP31

43 Third Semester B.E. Degree Examination, Dec.2019/Jan.2020

Additional Mathematics — I

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE fill question from each !nodule.

Module-1

1 a. Find modulus and amplitude of I– cos 9 + i sin 9 . (05 Marks)

b. Express $\frac{3+4i}{3-4i}$ in a +ib form. (OS Marks)

c. Find the value of 'X,' so that the points A(-1, 4, –3), B(3., 2, –5), C(-3, 8, –5) and D(-3, I), may lie on one plane. (06 Marks)

OR

2 a. Find the angle between the vectors a = 5 j+ k and b = 2 3 j+ 6k . (05 Marks)

b. Prove that | axb,bxc,cxa l=I abc | (05 Marks)

C. Find the real part of $\frac{1}{1+cose+isin 0}$ (06 Marks)

Module-2

3 a. Obtain the n^{th} derivatiVe of sin(ax +b). (05 Marks)

b. Find the pedal equation of = a" cosne (05 Marks)

c. If u = $\frac{Yz}{x}$, v = $\frac{zx}{y}$, w = $\frac{xy}{z}$, show that $\frac{a(u, v, w)}{a(x, y,z)}$ (06 Marks)

OR

4 a. If u og ($\frac{x. \pm y}{x + y}$ show that x $\frac{all}{aX}$ + y $\frac{ail}{ay}$ =3 .• (OS Marks)

b. If u = y, y z — x), show that $\frac{au}{ax}$ + $\frac{au}{ay}$ + $\frac{au}{az}$ =0. (05 Marks)

c. If y = a cos(logx) + bsin(log x), show that x^2 y,,, + (2n +1)xy,$_i$ + (n^2 +1)y,, =0 (06 Marks)

Module-3

5 a. Evaluate $\int_0^{1}$ xsin' xdx (05 Marks)

b. Evaluate f $x^2(1 x^2)^{3/2}$ dx (05 Marks)

c. Evaluate $\int_{-h}^{b}\int_{-a}^{a}$ f(x2 + y^2 +)dzdydx (06 Marks)

OR

6 a. Evaluate INix xydydx 0 x **(05 Marks)**

b. Evaluate f(x + y + z)dxdydz **(05 Marks)**

c. Evaluate 4 X dx . + x 2)4 **(06 Marks)**

Module-4

7 **a.** If r = (t - + 1) i+ (4t –3) j+ (2t - 6t)k find the angle between the tangents at t = 1 and t = 2. **(05 Marks)**

b. **If r =** e i+ 2cos3t j+ 2sin3tk , find the velocity and acceleration at any time t, and also their magnitudes at t = 0. **(05 Marks)**

c. Show that F = (y+ z) i+ (z + x) j+ (x + y) k is irrotational. Also find a scalar function 'y such that F = V(1). **(06 Marks)**

OR

8 a. Find the unit normal vector to the surface $x^2y + 2xz = 4$ at (2, –2, 3). **(05 Marks)**

b. If F = xz^3 i– $2x^2$ yz j+ $2yz^4$ k find V F and V x F at (1, –1, 1). **(05 Marks)**

c. **If** $\frac{da}{dt}$ = wx a and $\frac{db}{dt}$ = wx b , then show that $\frac{d}{dt}$(ax b) = wx (ax b) **(06 Marks)**

Module-5

9 a. Solve $\sec^2 x \tan y dx + \sec^2 y \tan x dy = 0$. **(05 Marks)**

b. Solve $(y^3 - 3x^2y)dx + (3xy^2 - x^3)dy = 0$. **(05 Marks)**

c. Solve $\frac{dy}{dx} + \frac{y}{x} = xy$. **(06 Marks'**

OR

10 a. Solve $\frac{dy}{dx} + y \cot x = \cos x$ **(05 Marks)**

b. Solve $x^2 ydx - (x^3 +)dy = 0$ **(05 Marks)**

c. Solve y(x + y)dx +(x + 2y –1)dy =0 **(06 Marks)**