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17MATDIP31

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020
Additional Mathematics - I

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Find the modulus and amplitude of $\frac{3+i}{2+i}$ **(07 Marks)**

lf x = cos° + sinO, then show that $\frac{x}{xr+1}$ =itan nO . **(07 Marks)**

c. Simplify $\frac{(\cos 30 + i\sin 30)^4(\cos 40 + i\sin 40)^5}{(\cos 40 + i\sin 40)^3(\cos 50 + i\sin 50)^{-4}}$ **(06 Marks)**

OR

2 a. Find the sine of the angle between A = 21+ 2j – k and B = 6i –33+ 2k . **(07 Marks)**

b. Find the value of X. , so that the vectors a = 2i –3j+ k , o = i + 2] –3K and c = i + are coplanar. **(07 Marks)**

c. Prove that a x (f) x c) + b x (c x + c x (a x = 0 . **(06 Marks)**

Module-2

3 a. Find the n^{th} derivative of e" cos(bx + c). **(07 Marks)**

b. If y = a cos(log x) + b sin(log x) prove that x^2y,,, 2 + (2n +1)xy,,_,. + (n^2 +1)y., = 0. **(07 Marks)**

c. If $u = \sin^{-1}\frac{x - y}{x + y}$, prove that $x\frac{a_u}{ox} + y\frac{a_u}{ay}$ = tan u. **(06 Marks)**

OR

4 a. Find the pedal equation of r= cos nO. **(07 Marks)**

b. Expand $\log_e$(I + x) in ascending powers of x as for as the term containing x^4. **(07 Marks)**

c. If x = r cos0, y = r sin°, find $\frac{3(x,y)}{?(r,0)}$ **(06 Marks)**

Module-3

5 a. Evaluate $\int^{y} 1(1+xy^2)\,dx\,dy$ **(07 Marks)**

b. Evaluate J $\sin^4$ X cos x dx **(07 Marks)**

c. Evaluate ʃ .\, 4 ? dx **(06 Marks)**

OR

6 a. Evaluate $\int_{3}^{4}$ Sky + eY dydx **(07 Marks)**

b. Evaluate fx $\sin^s$ x dx **(07 Marks)**

c. Evaluate 2 I I $(x^2 + y^2 + z^2)$dxdydz **(06 Marks)**

Module-4

7 a. If particle moves on the curve x = 2t ¯ , y = t^2 - 4t, z = 3t – 5 where t is the time. Find the velocity and acceleration at t = 1. **(07 Marks)**

b. Find the angle between the tangents to the curve r = t^2 2t j – t^3 k at the point t = ± 1. **(07 Marks)**

c. If /'=$(3x^2y - z)$i+$(xz^3 + y^4)$] –$2x^3z^2$ k find grad(div) at (2, –1, **0).** **(06 Marks'**

OR

8 a. Find the directional derivative of (I) = $4xz^3$ $3x^2y^2z$ at (2, –1, 2) along 21– 3 3+ 6IC **(07 Marks)**

b. Find the unit normal to the surface $x^2y + 2xz = 4$ at (2, –2, 3). **(07 Marks)**

c. Show that fs = $(2xy^2 + yz)$i + $(2x^2y + xz + 2yz^2)$] + $(2y^2z + xy)$k is irrotational. **(06 Marks)**

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9 a. Solve $\frac{dy}{dx} = \sin(x + y)$ **(07 Marks)**

b. Solve $\frac{dy}{dx} + y \cot x = \cos x$ **(07 Marks)**

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

OR

10 a. Solve + e' ^{4})dx + e'' (1 × Y. dy = 0 . **(07 Marks)**

b. Solve $(x^3 \cos^2 y - x \sin 2y)\,dx = dy$. **(07 Marks)**

c. Solve $(3x^2y^4 + 2xy)dx + (2x^3y^3 - x^2)dy =$ **0** **(06 Marks)**