Shree H.N. Shukla College of Science

M. Sc (Mathematics) (Sem-2)

Prelims Test

MATH.CMT-2004: Method in Partial Differential Equation

[Time: 2:30 Hours]   [Total Marks: 70]

1   Answer of the following questions   7x2=14

(a) Find general solution of $(D^2 - D - 2)z=0$.

(b) Find the complete integral of $p + q = 0$.

(c) Check following equation is integrable or not

   $(x+y)dx + xdy + zdz = 0$.

(d) Find integral curves of the equations $\frac{dx}{y^2+1} = \frac{dy}{x^2} = \frac{dz}{z^2y^2}$.

(e) Find particular integral of $(D^2+1)(D'^2 +1)z = e^{x+2y}$.

(f) Eliminate arbitrary constant a and b from the equation

   $Z = ax + by + a + b + ab$.

(g) $X^2 r - 2s + t =0$ is Hyperbolic if x ϵ ____

2   Answer of any two   14
   (a) Prove the pfaffaian differential equation
   $(y^2 + yz + z^2)dx + (x^2 + xz + z^2)dy + (x^2 + xy + y^2)dz$
   is integrable and find its complete primitive .   7

   (b) Classify the equation and convert into canonical form of
   $Y^2 r + 4x^2 t = xy$. $(x{\neq}0,y{\neq}0)$ 7

   (c) Using jecobi's method solve $xyp=q$.   7

3   Answer of the following questions

   (d) Prove that $F(D , D') [e^{ax+by} h(x,y)] = e^{ax+by} F(D+a , D' + b)[h(x,y)]$ 7

   (e) Find complete integral of $p^2 x + q^2 y = z$.   7

4   Answer of the following questions

(a)   convert into canonical form of $r + 2t = xy$ 7

(b)   Find complete integral of $px + q^2 y = zp^2q$ 7

5   Answer of the following questions

(a)   Using jecobi's method solve $Z=pqxy$.   7

(b)   Show that $Xcurl(X) = 0$ iff $uxcurl(ux)=0$. Where $X=(P,Q,R)$

and P ,Q, u and R are function of x,y and z.   7

BEST OF LUCK

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