SUNDARBAN MAHAVIDYALAYA

INTERNAL EXAMINATION 2020

Subject : MTMA , Paper : CC9

Full Marks : 20 **Time : 2 hours**

Chose the correct option from the following question: 2X10=20

1. For the partial differential equation $r + t = 0$ where $r = \frac{\delta^2 z}{\delta x^2}$, $t = \frac{\delta^2 z}{\delta y^2}$ which are the following statement is true.
   a) first order, linear b) second order, linear
   c) second order, non linear d) first order, non linear
2. The required partial differential equation by eliminating the function f from $Z = xf(\frac{y}{x})$ is
   a) $xp + yq = z$ b) $\frac{x}{p} + \frac{y}{q} = 1$
   c) $x + y = pq$ d) xp+yq=1
3. The partial differential equation of all spheres of radius λ , having centre in the xy plane is
   a) $p^2 + q^2 + 1 = \lambda$ b) $z^2(p^2 + q^2 + 1) = 1$
   c) $z^2(p^2 + q^2 + 1) = \lambda^2$ b) None of these
4. By Lagrange method the general solution of the partial differential equation $xp - yq = xy$ is
   a) $xy \log x - z = \phi(xy)$ b) $xy - z \log x = \phi(\frac{x}{y})$
   c) $xy - z = \phi(xy)$ d) None of these
5. The given equation $u_{tt} = c^2(u_{xx} + u_{yy} + u_{zz})$ is called
   a) linear three dimensional heat equation. b) Laplace Equation in three dimensions.
   c) linear three dimensional wave equation. d) non linear one dimensional Burger equation.
6. The Canonical form for the elliptic equation is
   a) $u_{\eta\eta} = \frac{2\xi}{\eta 2} u_\xi + \frac{1}{\eta^2} e^{\xi/\eta}$ b) $u_{\alpha\alpha} + u_{\beta\beta} = -\frac{u_\alpha}{2\alpha}$
   c) $u_{\xi\eta} = 0$ d) None of these
7. The value of $\iint_{\mathbb{R}} xy(x^2 + y^2)dxdy$ over $\mathbb{R}$: $[0, a; 0, b]$ is
   a) $\frac{1}{2}a^2b^2(a^2 + b^2)$ b) $a^2b^2(a^2 + b^2)$ c) $\frac{1}{8}a^2b^2(a^2 + b^2)$ d) None of this
8. The value of $\iint_{\mathbb{R}}(x^2 + y^2)dxdy$ over $\mathbb{R}$ bounded by $y = x^2, x = 2, y = 1$ is
   a) $\frac{192}{105}$ b) $\frac{1000}{99}$ c) $\frac{1006}{105}$ d) $\frac{123}{100}$
9. A vector $\vec{F}$ is said to be irrotational if
   a) $div\ \vec{F} = 0$ b) $Curl\vec{F} = \vec{O}$ c) $div\vec{F} = \vec{O}$ d) $Curl\vec{F} = 0$
10. If r be the distance of $P(x.y.z)$ from the origin and $\vec{r}$ be the position vector of P relative to the origin, then the value of $\nabla^2(\frac{1}{r})$ is
    a) 0 b) 1 c) $x + y + z$ d) xyz