GATE - Maths - 2008 - 1-17

1

(GATE 2008)

d) 100

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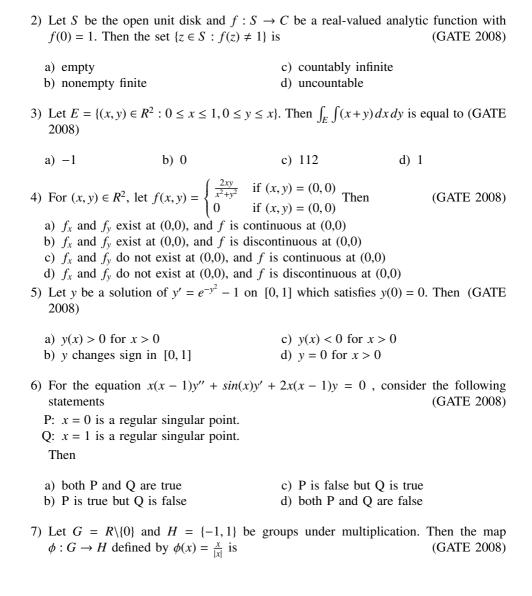
1) Consider the subspace $W = \{[a_{ij}] : a_{ij} = 0 \text{ if } i \text{ is even}\}\$ of all 10x10 real matrices.

c) 75

Then the dimension of W is

b) 50

a) 25



(GATE 2008)

(GATE 2008)

d) 3

a) 1	b) 2	c) 3	d) ∞
10) Consider the initial value problem $\frac{dy}{dx} = f(x, y), y(x_0) = y_0$. The aim is to compute the value of $y_1 = y(x_1)$, where $x_1 = x_0 + h(h > 0)$. At $x = x_1$, if the value of y_1 is equated to the corresponding value of the straight line passing through (x_0, y_0) and having the slope equal to the slope of the curve $y(x)$ at $x = x_0$, then the method is called (GATE 2008)			
a) Euler's methodb) Improved Euler's method		c) Backward Euler's methodd) Taylor series method of order 2	
11) The solution of xu_x	$y + yu_y = 0$ is of the fo	orm	(GATE 2008)
a) $f(y/x)$	b) $f(x+y)$	c) $f(x-y)$	d) $f(x)$
12) If the partial differential equation $(x-1)^2 u_{xx} - (y-2)^2 u_{yy}$, $+2xu_x + 2yu_y + 2xyu = 0$ is parabolic in $S \subseteq \mathbb{R}^2$ but not in $\mathbb{R}^2 \backslash S$, then S is (GATE 2008)			
a) $\{(x, y) \in \mathbb{R} : x = 1\}$ b) $\{(x, y) \in \mathbb{R} : x = 1\}$	•	c) $\{(x, y) \in \mathbb{R}^2 : x = d\}$ d) $\{(x, y) \in \mathbb{R}^2 : y = d\}$	
13) Let E be a connected subset of $\mathbb R$ with at least two elements. Then the number of elements in E is (GATE 2008)			
a) exactly twob) countably infinite		c) more than two but finited) uncountable	
 14) Let X be a non-empty set. Let ε₁, and ε₂, be two topologies on X such that ε₁, is strictly contained in ε₂. If I: (X, ε₁) → (X, ε₂) is the identity map, then (GATE 2008) a) both I and I⁻¹ are continuous b) I is continuous but I⁻¹ is not continuous c) both I and I⁻¹ are not continuous d) I is not continuous but I⁻¹ is continuous 			

c) 2

9) For $1 \le p \le \infty$, let $\| \cdot \|_p$ denote the *p*-norm on \mathbb{R}^2 . If $\| \cdot \|_p$ satisfies the parallelogram

a) not a homomorphism

law, then p is equal to

d) an isomorphism

a) 0

b) a one-one homomorphism, which is not ontoc) an onto homomorphism, which is not one-one

b) 1

8) The number of maximal ideals in \mathbb{Z}_{27} is

15) Let $X_1, X_2, \dots X_{10}$ be a random sample from $N(80, 3^2)$ distribution. Define

$$S = \sum_{i=1}^{10} U_i$$
 and $T = \sum_{i=1}^{10} \left(U_i - \frac{S}{10} \right)^2$

where $U_i = \frac{X_i - 80}{3}$, i = 1, 2, ..., 10. Then the value of E(ST) is equal to (GATE 2008)

- a) 0 b) 1 c) 10 d) $\frac{80}{3}$
- 16) Two (distinguishable) fair coins are tossed simultaneously. Given that ONE of them lands up head, the probability of the OTHER to land up tail is equal to (GATE 2008)
 - a) $\frac{1}{3}$ b) $\frac{1}{2}$ c) $\frac{2}{3}$
- 17) Let $c_{ij} \ge 2$ be the cost of the $(i, j)^{th}$ cell of an assignment problem. If a new cost matrix is generated by the elements $c_{ij}^* = \frac{1}{2}c_{ij} + 1$, then (GATE 2008)
 - a) optimal assignment plan remains unchanged and cost of assignment decreases
 - b) optimal assignment plan changes and cost of assignment decreases
 - c) optimal assignment plan remains unchanged and cost of assignment increases
 - d) optimal assignment plan changes and cost of assignment increases