MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

II SEMESTER B.TECH. INTERNAL EXAMINATIONS JANUARY- 2018

TEST - 1

SUBJECT: ENGG. MATHEMATICS-II [MAT 2101]

Date of Exam: **08/02/2018** Time of Exam: **8.00 AM – 9.00 AM** Max. Marks: **15**

Instructions to Candidates:

- Answer ALL the questions & missing data may be suitable assumed

1.	Find the coefficient of x^4 from the Maclaurin's expansion of $\cos x \cos y$	**1**
2.	Expand log (secx) up to the term containing x^4.	**1**
3.	$If\ u = x^4\, y^6 \cos^{-1}\left(\frac{y}{x}\right) - x^3\, y^7 \cot^{-1}\left(\frac{x}{y}\right)$ *then the value of* $x^2 u_{xx} + 2xy\, u_{xy} + y^2 u_{yy}$ *is*	**1**
4.	$Evaluate \lim_{x\to 0}\left\{\frac{1}{x^2} - \frac{1}{\sin^2 x}\right\}$	**1**
5.	*Find the valuue of C from Cauchy mean value theorem for the functions* $, f(x) = x^2$ *and* $g(x) = x^4$ *in the interval* $[1,2]$	**1**
6.	If $x = r\cos\theta$ *and* $y = r\sin\theta$ then Prove that $\frac{\partial^2 r}{\partial x^2} + \frac{\partial^2 r}{\partial y^2} = \frac{1}{r}\left\{\left(\frac{\partial r}{\partial x}\right)^2 + \left(\frac{\partial r}{\partial y}\right)^2\right\}$	**2**
7.	Find the extreme value of $f(x,y) = x^4 + y^4 - 2(x-y)^2$	**2**
8.	In estimating the cost of pile of bricks measured as 2m x 15m x 1.2m the tape is stretched 1% beyond the standard length. If the count is 450 bricks per cubic meter & the brick cost Rs 1.10 per thousand find the approximate error in the cost.	**2**
9.	If $u = f(2x-3y,\ 3y-4z,\ 4z-2x)$ then Prove that $6\frac{\partial u}{\partial x} + 4\frac{\partial u}{\partial y} + 3\frac{\partial u}{\partial z} = 0$	**2**
10	Change the order of integration and evaluate $\int_0^1 \int_x^{\sqrt{x}} (x^2 + y^2)\, dy\, dx$	**2**

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