Reg.No. _____

Karunya UNIVERSITY

(Karunya Institute of Technology & Sciences)
(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – April/May – 2017

Code : 13MA202 **Duration : 3hrs**
Sub. Name : CALCULUS AND STATISTICS **Max. marks : 100**

ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)

Q. No.	Sub Div.	Questions	Course Outcome	Marks
1.	a.	Solve $(D^2 - 4D + 3)\, y = e^{4x} + \sin 3x + x^2$	CO1	10
	b.	Solve $y'' + y = \tan x$ by the method of variation of parameters.	CO1	10
		(OR)		
2.	a.	Solve $(x^2D^2 - xD + 1)y = \left(\frac{logx}{x}\right)^2$	CO1	10
	b.	Solve $\frac{dx}{dt} + 2x - 3y = 5t$; $\frac{dy}{dt} - 3x + 2y = 2e^{2t}$	CO1	10
3.	a.	Change the order of integration and then evluate $\int_0^{4a} \int_{\frac{x^2}{4a}}^{2\sqrt{ax}} xy\, dydx$	CO1	10
	b.	Evaluate $\iint (x^2 + y^2) dx\, dy$ over the region bounded by the lines x=0, y=1 and x+y = 1	CO1	10
		(OR)		
4.	a.	Find the area of ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$	CO1	10
	b.	Find the volume of the tetrahedron bounded by the planes x= 0, y = 0, z= 0 and x + y +z = 1	CO1	10
5.	a.	Prove that $\beta(m,n) = \frac{\Gamma(m)\,\Gamma(n)}{\Gamma(m+n)}$	CO1	10
	b.	Evaluate $\int_0^{\frac{\pi}{2}} \sqrt{tan\theta}\, d\theta$	CO1	10
		(OR)		
6.	a.	Evaluate $\int_0^1 x^m (1 - x^n)^p\, dx$ and hence find the value of $\int_0^1 x^5 (1 - x^3)^{10}\, dx$	CO1	10
	b.	Prove that $\frac{\beta(m+1,n)}{m} = \frac{\beta(m,n)}{m+n} = \frac{\beta(m,n+1)}{n}$	CO1	10
7.	a.	Solve $z = px + qy + \sqrt{1 + p^2 + q^2}$	CO1	10
	b.	Form a PDE by eliminating the arbitrary functions ‘f ’ and ‘g’ in z = f(2x+y) +g(3x-y).	CO1	10
		(OR)		
8.	a.	Solve $x^2 (y-z)\, p + y^2 (z-x)\, q = z^2 (x-y)$.	CO1	10
	b.	Solve $(D^2 - 3DD' + 2D'^2)\, z = e^{2x+3y} + \sin(x - 2y)$	CO1	10

<table>
<tr><td></td><td></td><td><u>Compulsory:</u></td><td></td><td></td></tr>
<tr><td rowspan="2">9.</td><td>a.</td><td>Find the Mean, Median and Mode for the following data:
<table>
<tr><td>Marks</td><td>0-10</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td><td>50-60</td><td>60-70</td></tr>
<tr><td>frequency</td><td>14</td><td>17</td><td>22</td><td>26</td><td>23</td><td>18</td><td>10</td></tr>
</table></td><td>CO1</td><td>10</td></tr>
<tr><td>b.</td><td>Obtain the correlation coefficient for the following heights (in inches) of fathers (X) and their sons(Y):
<table>
<tr><td>X</td><td>55</td><td>56</td><td>58</td><td>59</td><td>60</td><td>60</td><td>62</td><td>58</td><td>64</td></tr>
<tr><td>Y</td><td>35</td><td>36</td><td>38</td><td>39</td><td>44</td><td>43</td><td>45</td><td>50</td><td>53</td></tr>
</table></td><td>CO1</td><td>10</td></tr>
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ALL THE BEST

<u>Course Outcome:</u>

• Students will be able to relate their subject knowledge with their engineering subjects during their course of study.