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Manipal College of Pharmaceutical Sciences
Manipal Academy of Higher Education, Manipal
First Year B Pharm Supplementary Exam
July 2019

Course Code: MAT 101 Course Title: Mathematics

Date: 02.07.2019

Time: 3hrs

Max. Marks: 70

I. Long Essay Questions

3*10 =30marks

- 1A. ABC is a triangle formed by the points A (3, -7) B (7, 9) and C (-3, 3) find the equations of the altitudes. 7m
- 1B. What is distance formula? Derive an equation for it. 3m
- 2A. Find the adjoint of $\begin{pmatrix} 1 & 2 & 2 \\ 1 & 3 & 4 \\ 1 & 4 & 3 \end{pmatrix}$ 7m
- 2B. If $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$ Find $A^2 - 5A + 7I$ 3m
- 3A. State Cayley Hamilton Theorem and verify the same for the square matrix $\begin{pmatrix} 1 & -2 \\ 3 & 4 \end{pmatrix}$ 7m
- 3B. Differentiate sum of 2 functions of x w.r.t.x from first principles. 3m

II. Short Essay Questions

6*5 =30marks

4. Find the characteristic equation of the matrix of $A = \begin{pmatrix} 1 & 2 & 3 \\ 0 & -4 & 2 \\ 0 & 0 & 7 \end{pmatrix}$
5. Find the centre, radius, diameter and circumference of the circle $x^2+y^2+2x-6y+1=0$
6. Evaluate (i) $\lim_{x \rightarrow 0} \frac{\sqrt{1+x} - 1}{x}$ (ii) $\lim_{x \rightarrow 0} \frac{5x}{\sqrt{1+x} - 1}$
7. Find the characteristic roots of the matrix $\begin{pmatrix} 1 & 2 \\ 2 & 1 \end{pmatrix}$
8. Show that the equation $x^2+y^2+2gx+2fy+c=0$
9. Evaluate (i) $\lim_{\theta \rightarrow 0} \frac{\sin 13\theta}{\sin 9\theta}$ (ii) $\frac{\sin 5x - \tan 7x}{x}$ (iii) $\lim_{x \rightarrow \infty} \frac{6x^2 - 9x + 1}{4x^2 - 3x + 5}$

III. Short Answer

5*2 =10marks

10. Differentiate w.r.t.X $\frac{f^2+x^2}{f^2-x^2}$

11. Find the distance between the points (i) (2,-3) and (6, 5) and (ii) (3, 1) (7, 4)

12. If $A = \begin{pmatrix} 3 & 4 \\ 1 & 2 \end{pmatrix}$ Find (i) adj A (ii) A^2

13. Given P (8, k) Q (5, 7) R (-1, +1) and S (2, -2). If PQ is parallel to RS, find the value of k

14. If $A = \begin{pmatrix} 2 & 3 \\ 4 & 0 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 0 \\ 3 & 2 \end{pmatrix}$ Find $4A-2B$

End of Question Paper