

**FACULTY****B. Pharmacy I – Year (Non CBCS)(Backlo) Examination, August 2019****Subject : Mathematics****Time : 3 hrs****Max. Marks : 70****Note : Answer all questions. All questions carry equal marks.**

1 a) i) Find the solution of the equation  $10^{x+3} = 6^{2x}$ .

ii) If  $\tan 35^\circ = K$  then the value of  $\frac{\tan 145^\circ \square \tan 125^\circ}{1 + \tan 145^\circ \cdot \tan 125^\circ}$ .

**OR**

b) i)  $\log_2 x + \log_2 (x^2) = 3$ .

ii) if  $\tan a = \frac{1}{3}$  and  $\tan b = \frac{1}{7}$  then show that  $\tan (2\alpha + \beta) = 1$ .

2 a) i) Find the derivative of  $\tan x$  using first principle.

ii) Show that the function is not differentiable at 2 where

$$f(x) = \begin{cases} x; & 0 \leq x \leq 2 \\ 2; & x \geq 2 \end{cases}$$

**OR**

b) i) Find the maximum and minimum values of the polynomial  $f(x) = x^3 - 4x^2 + 8x - 6$

ii) If  $u = xy f\left(\frac{y}{x}\right)$ , prove that  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 2u$ .

3 a) i) Evaluate  $\int \frac{1}{3+5x \square 2x^2} dx$  ii)  $\int \frac{1+\sin^2 x}{1+\cos^2 x} dx$

**OR**

b) i) Evaluate  $\int \frac{1}{4+5\sin x} dx$

ii) Evaluate  $\int \frac{2x+6}{x^2+3x \square 6} dx$

4 a) i) If  $A = \begin{bmatrix} a^2 & ab & ac \\ ab & b^2 & bc \\ ac & bc & c^2 \end{bmatrix}$  and  $a^2 + b^2 + c^2 = 1$  then find  $A^2$ .

ii) Solve the equation  $7x + 5y - 13z + 4 = 0$ ,  $9x + 2y + 11z - 37 = 0$ ,  $3x - y + z = 2$  by matrix inversion method.

**OR**

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b) i) Find the rank of the matrix  $A = \begin{bmatrix} 1 & \square 1 & 2 & 3 \\ 2 & 2 & 3 & 4 \\ 3 & 4 & 5 & 6 \end{bmatrix}$

ii) If  $A = \begin{bmatrix} 0 & 2 & 1 \\ \square 2 & 0 & \square 2 \\ \square 1 & x & 0 \end{bmatrix}$  is a skew symmetric matrix, then find the value of x.

- 5 a) i) Find the equation of circle passing through the points (1, 0) (0, 1) (1, 1).  
ii) Find the equation of the line having intercepts a and b on the axes such that  $a + b = 3$  and  $ab = 1$ .

**OR**

- b) i) Write the basic mathematical principles are used in Biological testing.  
ii) Find the equation of circle passing through (7, 1) and having centre at (4, 3).

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