

FACULTY

B. Pharmacy I Year (Main) Examination, April / May 2016

Subject : Mathematics

Time : 3 Hrs

Max. Marks: 70

Note: Answer all questions. All questions carry equal marks.

- 1 (a) (i) Solve the equation for x
 $e^{2x} - e^x - 6 = 0$.
 (ii) In a triangle ABC, prove that $\sin 2A + \sin 2B - \sin 2C = 4 \cos A \cos B \cos C$

OR

 (b) (i) If $x = 1 + \log_a bc$; $y = 1 + \log_b ca$; and $z = 1 + \log_c ab$. Prove that $xyz = xy + yz + zx$.
 (ii) If $\tan 35^\circ + \cot 37^\circ + \tan 325^\circ = x \tan 53^\circ + \tan 127^\circ$ then find the value of x.
- 2 (a) (i) Find the derivative of $\sec x$ using first principle.
 (ii) If $f(x) = \begin{cases} 5x + 4; & 0 < x \leq 1 \\ 4x^2 + 3bx; & 1 < x < 2 \end{cases}$
 Is continuous at every point of its domain then find the value of b.

OR

 (b) (i) Find the maximum and minimum values of the polynomial $f(x) = x^3 - 3x^2 - 6x + 6$.
 (ii) If $u = e^{x/y} \sin\left(\frac{x}{y}\right) + e^{y/x} \cos\left(\frac{y}{x}\right)$ then show that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 0$.
- 3 (a) (i) Evaluate $\int e^x \sqrt{1+e^x} dx$.
 (ii) Evaluate $\int \frac{\sin x + \cos x}{\sqrt{1 + \sin 2x}} dx$.

OR

 (b) (i) Evaluate $\int \frac{1}{4 + 5 \cos x} dx$.
 (ii) Evaluate $\int \frac{4x + 12}{4x^2 + 24x + 6} dx$
- 4 (a) (i) If $A = \begin{bmatrix} 8 & 5 \\ 2 & 4 \end{bmatrix}$ satisfies the equation $x^2 + 4x - p = 0$ then find 'P'.
 (ii) Solve the equation $2x + 4y + 5z = 18$; $2x - y + 8z = 13$ and $5x - 2y + 7z = 20$ by matrix inversion method.

OR

 (b) (i) Find the rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 0 & 2 & 3 & 4 \\ 2 & 4 & 6 & 8 \end{bmatrix}$.
 (ii) If $A = \begin{bmatrix} 0 & 1 \\ 2 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 \\ 4 & 3 \end{bmatrix}$ and $C = \begin{bmatrix} 2 & 1 \\ 6 & 5 \end{bmatrix}$ then prove that $A(B + C) = AB + AC$.
- 5 (a) (i) Explain linear and non linear graphs with examples.
 (ii) Find the equation of circle whose centre is (1, 2) and the end of diameter is (4, 6).

OR

 (b) (i) What are the basic mathematical principles used in Biological Testing.
 (ii) Find the equation of the line perpendicular to the line $2x + 3y - 5 = 0$ and passing through (3, 4).
