

FACULTY OF PHARMACY
B. Pharmacy I-Year (Main & Backlog) Examination, June 2011
MATHEMATICS
Time : Three Hours]
[Maximum Marks : 70
Note Answer ALL questions. All questions carry equal marks.

1. (A) If $\sin a = \frac{1}{10}$, $\sin 13 = \frac{1}{4}$ and $a, 13$ are acute then show that $a + 13 = \frac{\pi}{4}$.

9.1 If $\tan A = \frac{1}{2}$ and $\tan B = \frac{3}{4}$ where A and B are acute angles then find $A + B$.

OR

AB) (if $\sin A - \sin (60 + A) \sin (60 - A) = \frac{1}{4} \sin 3A$.

Prove that $4 \sin 20^\circ \sin 40^\circ \sin 60^\circ \sin 80^\circ = \frac{3}{4}$.

2. (A)/ Find the derivatives of the following function $\tan 2x$ using first principle.

(ii) If $U = \sec^{-1} \frac{(x^2 + y^2)^{3/2}}{x + y}$ then show that $\frac{5u}{8x} + \frac{8u}{5y} \cot u$.

(iii) If f , given by $f(x) = \begin{cases} K^2 x - K & \text{if } x \geq 1 \\ 2 & \text{if } x < 1 \end{cases}$ is a continuous function on $\mathbb{R}$, then find the value of K .

OR

(j(i) Prove that $x^3 + 3x^2 + 3x + 7 = 0$, has neither maxima nor minima.

) Show that $f(x) = \sin x (1 + \cos x)$ has a maximum value at $x = \frac{\pi}{3}$.

3. (A) (i) Find the value of $\int \frac{\cos x + 3 \sin x + 7}{\cos x + \sin x + 1} dx$.

(ii) Evaluate $\int \frac{2 \sin x + 3 \cos x + 4}{3 \sin x + 4 \cos x + 5} dx$

(iii) Evaluate $\int \frac{dx}{4 \pm \cos x}$

OR

94 (t.)-- Evaluate $\int \frac{1 + \sin x}{x + \cos x} dx$

(i.) Evaluate $\int \frac{2x+3}{x^2 + x - 2} dx$

i) Evaluate $\int \sec^2 x \csc^2 x dx$.

4. (A) (i) Show that $\begin{vmatrix} 1 & a^2 & a^1 \\ 1 & b^2 & b^3 \\ 1 & c^2 & c^1 \end{vmatrix} = -(a-b)(b-c)(c-a)(ab+bc+ca)$

ii) Show that $\begin{vmatrix} a+b+2c & a & b \\ c & b+c+2a & b \\ c & a & c+a+2b \end{vmatrix} = 2(a+b+c)^3$

OR

(B) (i) Solve the following equations by Gauss-Jordan method :

$$3x + 4y + 5z = 18, 2x - y + 8z = 13, 5x - 2y + 7z = 20.$$

If $A = \begin{pmatrix} 1 & 2 & 1 \\ 1 & -1 & 1 \\ 3 & -1 & 1 \end{pmatrix}$ then find $A' - 3A^2 + A - 3I$.

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5. (A) (0 Discuss the set of Postulates defining Boolean Algebra.

(ii) Find the eccentricity, co-ordinates of foci, length of latus rectum and equations of directrices of the ellipse.

$$9x^2 + 16y' - 36x + 32y - 92 = 0.$$

OR

(B) (i) Find the intercepts of the plane $4x + 3y + 2z + 2 = 0$ on the co-ordinate axes.

(ii) Write Boolean function to realize the full adder and draw the corresponding logic diagram.