



UNIVERSITY OF JAFFNA, SRI LANKA  
FACULTY OF ALLIED HEALTH SCIENCES

FISTER YEAR FIRST SEMESTER EXAMINATION IN B.Pharm (Hons) – 2019

PHAPM 1181 PHARMACEUTICAL MATHEMATICS

Date : 27.04.2021

Time: One hour

Answer All Questions

1. (a) i. If  $\alpha, \beta$  are the roots of the quadratic equation  $5x^2 - 6x + 3 = 0$ , form a quadratic equation whose roots are
- $\alpha^2, \beta^2$ ;
  - $\alpha^3\beta, \alpha\beta^3$ .
- ii. For what values of  $K$ , the roots of the quadratic equation  $Kx^2 + 4x + (K - 3) = 0$  are equal.
- (b) Use the logarithm laws to write each of the following expression as a single logarithm:
- $\ln(a + 1) - \frac{1}{3} \ln(b - 1) - 3[\ln(c + 2) - \ln(d - 2)]$ ;
  - $\frac{1}{2} \log_2 u + \frac{1}{3} \log_2 y - \frac{1}{2}(\log_2 a + \log_2 b)$ ;
  - $1 + 2 \log_a b - \log_a ab$ .
- (c) Prove that
- $\cos^4 \theta - \sin^4 \theta = 1 - 2 \sin^2 \theta$ ;
  - $\frac{\sec x - \cos x}{1 + \cos x} = \sec x - 1$ .
- (d) If  $\theta_1$  and  $\theta_2$  are acute angles such that  $\sin \theta_1 = \frac{3}{5}$  and  $\sin \theta_2 = \frac{5}{13}$ , find the numerical value of  $\sin(\theta_1 + \theta_2)$  and  $\cos(\theta_1 + \theta_2)$ .  
In what quadrant does the angle  $\theta_1 + \theta_2$  lie?

Continued

2. (a) Differentiate the following with respect to  $x$  and simplify the answer.

i.  $(3x^3 - 2x^2 + 4)(2x - 1)$ ;

ii.  $\frac{x^3 + 5x^2 - 2x + 4}{x^2 + 9}$ ;

iii.  $\sin(x^2 + 3)$ ;

iv.  $e^{\cos 2x}$ .

(b) Find the value of  $\frac{dy}{dx}$  at the point specified:

i.  $x^2 + y^2 = 25$  at  $(3, -4)$ ;

ii.  $x^2 + 4xy - 2y^2 - 8 = 0$  at  $(0, 2)$ ;

iii.  $x \sin y + y^2 = 1 + \frac{\pi^2}{4}$  at  $(1, \frac{\pi}{2})$ .

(c) Find the following integrals:

i.  $\int \left( 3\sqrt{x} - \frac{2}{x^3} + \frac{1}{x} \right) dx$ ;

ii.  $\int \sqrt{x}(x^2 - 1) dx$ ;

iii.  $\int x^5 e^{1-x^6} dx$ , you may use the substitution  $t = 1 - x^6$ ;

iv.  $\int \frac{2x \ln(x^2 + 1)}{x^2 + 1} dx$ , you may use the substitution  $t = x^2 + 1$ .

End of Exam



Prasanna