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University of Jaffna, Sri Lanka
Faculty of Allied Health Sciences
First Year First Semester Examination in B.Pharm Honours - 2021
End of Course Examination
PHAPM1181 - Pharmaceutical Mathematics

21 DEC 2022

~~Allied Health Sciences~~

Answer all questions

Time: One hour

1. (a) Solve the following quadratic equations by factorization.

i. $x^2 + 7x = 8$,

ii. $3x^2 + 7x + 4 = 0$,

iii. $x^2 - 5x + 6 = 0$.

(b) Find the nature of the roots of following quadratic equations.

i. $2x^2 + 3x + 1 = 0$,

ii. $3x^2 + 7x - 2 = 0$,

iii. $9x^2 + 6x + 1 = 0$.

(c) For what values of "k", the roots of the following quadratic equation

$$kx^2 + 4x + (k - 3) = 0$$

are equal?

(d) Evaluate the following logarithms without using a calculator.

i. $\log_2 \left(\frac{1}{16} \right)$,

ii. $\log_5 125$,

iii. $\log_2 3 + \log_2 24 - \log_2 9$,

iv. $\frac{2 \log_7 125}{3 \log_7 5}$.

(e) Solve the following logarithmic equations for x :

i. $\log_6 x + \log_6(x + 5) = 2$,

ii. $\ln(4 - x) + \ln 2 = 2 \ln x$,

iii. $\log_4(2x + 4) - 2 = \log_4 3$.

Continued...

(f) Write as a single logarithm:

$$\log x + 3 \log y - 4 \log z.$$

2. (a) Prove the following trigonometric identities:

i. $\frac{\sec \theta - \cos \theta}{1 + \cos \theta} = \sec \theta - 1,$

ii. $\frac{\sin \theta}{\operatorname{cosec} \theta} + \frac{\cos \theta}{\sec \theta} = 1,$

iii. $\sqrt{\frac{1 - \sin \theta}{1 + \sin \theta}} = \sec \theta - \tan \theta.$

(b) Show that $\sin(x + y) + \sin(x - y) = 2 \sin x \cos y.$

(c) Find the derivative $\left(\frac{dy}{dx}\right)$ of each of the functions given below.

i. $y = 2\sqrt{x},$

ii. $y = x^2(2x - 1),$

iii. $y = \frac{2x + 1}{x + 3},$

iv. $y = (3x + 1)(2x - 7),$

v. $y = \sin x + \cos x.$

(d) Calculate the following definite integrals.

i. $\int_0^{\frac{\pi}{2}} \cos x \, dx,$

ii. $\int_{-2}^2 x^2 \, dx.$

(e) Find the following indefinite integrals.

i. $\int x(2x + 1)^2 \, dx,$

ii. $\int \frac{x^2 + 2x + 1}{x^2} \, dx.$

End of Exam