UNIVERSITY OF JAFFNA, SRI LANKA
FACULTY OF ALLIED HEALTH SCIENCES
Second Year First Semester Examination in B.Pharm Hons-2021
PHAMM 2111-PHARMACEUTICAL MATHEMATICS

Date :**01.02.2023** Time: One hour

Answer All Questions

1. (a) i. Examine the nature of roots in each of the following quadratic equations and also verify them by quadratic formula.
   - $x^2 + 9x + 10 = 0$;
   - $\sqrt{2}t^2 - 3t + 3\sqrt{2} = 0$.

   ii. Prove that if α and β are roots of the equation $x^2 - px - p - c = 0$ then $(1+\alpha)(1+\beta) = 1 - c$.

   (b) Use the logarithm laws to write each of the following expression as a single logarithm:

   i. $\log_5 x - 2$;

   ii. $\frac{1}{2}\log_2 u + \frac{1}{3}\log_2 y - \frac{1}{2}[\log_2 a + \log_2 b]$;

   iii. $2\ln(w-5) - \frac{1}{2}[\ln(x+y) - \ln(x-y)]$.

   (c) Prove that

   i. $\frac{1}{1+\sin\theta} + \frac{1}{1-\sin\theta} = 2\sec^2\theta$;

   ii. $\tan\left(\frac{\pi}{4} + \alpha\right) = \frac{1+\tan\alpha}{1-\tan\alpha}$.

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

i. $(2x+3)(5x^2-7x+1)$;

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

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

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

i. $x^2+y^2=1$ at $(\sqrt{2},\sqrt{2})$;

ii. $x^2+xy+y^2=1$ at $(1,-1)$;

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

(c) Find the following integrals:

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

ii. $\displaystyle\int\left(\frac{3+5x-6x^2-7x^3}{2x^2}\right)dx$;

iii. $\displaystyle\int x^3\sqrt{x^4+1}\,dx$, you may use the substitution $t=x^4+1$.

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