HEALTH AND APPLIED SCIENCES DEPARTMENT
CAT II
CLASS:2025CSMT-JAN/APRIL
TRIGANOMETRY AND HYPERBOLICS
CM7103
2 HOURS

Instructions

1. Attempt ALL THE QUESTIONS

2. DO NOT write on the question paper

3. Question paper to be submitted together with the booklet

1. (a) Given that $\cos A = \frac{4}{5}$ and $\sin B = \frac{15}{17}$ where A and B are acute angles, find without using trigonometrical table or a calculator the values of;

   i. $\sin(A + B)$ (4 mks)

   ii. $\cos(A - B)$ (4 mks)

   (b) Given that $\sin 60° = \frac{\sqrt{3}}{2}$, $\cos 45° = \frac{1}{\sqrt{2}}$ find the values of the following without using trigonometric table or a calculator

   i. $\sin 15°$ (3 mks)

   ii. $\cos 15°$ (3 mks)

   iii. $\tan 75°$ (6 mks)

2. (a) Find the value of t if

   $5\cos^2 t + 3\sin t = 3$ for $0° < t < 360°$ (5 mks)

   b(i)if $6\sin\omega t - 2.5\cos\omega t = R\sin(\omega t + \alpha)$ are α is an angle and ω is a scalar , find R and α (7 mks)

   ii.solve $7\cos\emptyset - 9\sin\emptyset - 7.4 = 0$ for $0° < \emptyset < 360°$ (8 mks)

3. (a) Verify each of the following identities;

   i. $1 - \frac{\sin^2 x}{2 \sec x} = \cos x$ (6 mks)

   ii.$\cot 2y + \csc 2y = \cot y$ (6 mks)

   iii. $\sqrt{\left(\frac{1-\sin x}{1+\sin x}\right)} = \sec x - \tan x$ (8 mks)

4. (a) Evaluate the following

   i. $\tanh 1.27$ (3 mks)

   ii. $\tanh^{-1} 0.75$ (8 mks)

   (b) Show that $\cosh^{-1} x = \ln(x + \sqrt{x^2 - 1})$ (9 mks)