



TED (21) 1002  
(Revision-2021)

**N22-2102220004 A**

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Reg.No.....

Signature.....

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/  
COMMERCIAL PRACTICE, NOVEMBER - 2022**

**MATHEMATICS - I**

[Maximum marks: 75]

(Time: 3 Hours)

**(PART A)**

**I. Answer *all* the following questions in one word or one sentence. Each question carries 'one' mark.**

**(9 x 1 = 9 Marks)**

		Module outcome	Cognitive level
1	Write the modulus of the complex number $2i$	M1.01	U
2	Write the equation to a straight line with slope = 2 and y intercept = -1	M1.02	U
3	45 degree = .....radians.	M2.01	U
4	Evaluate $\sin 30^0 + \cos 60^0$	M2.02	R
5	Write the formula for $\sin (A+B)$	M2.03	R
6	Find $\lim_{x \rightarrow 2} 5x-1$	M3.01	U
7	Find the derivative of $x^5+5$	M3.03	U
8	Find $\frac{dy}{dx}$ if $x^2+y^2=5$	M4.02	A
9	Find the second derivative of $x$	M4.03	A

**(PART B)**

**II. Answer any *eight* questions from the following. Each question carries 'three' marks**

**(8 x 3 = 24 Marks)**

		Module outcome	Cognitive level
1	If $z_1 = 3+i$ and $z_2 = 5-2i$ then find $z_1 + z_2$ and $z_1 - z_2$	M1.01	R
2	Find the perpendicular distance from the point (1,1) to the line $4x + 3y - 2 = 0$	M1.04	R
3	If $\sin A = \frac{3}{5}$ then find $\cos A$ and $\tan A$ ?	M2.02	R
4	Evaluate $\cos 330^0 - \sin 120^0$	M2.02	U
5	Show that $\sin 35^0 + \sin 25^0 = \cos 5^0$	M2.03	A
6	Find $\lim_{\theta \rightarrow 0} \frac{\sin 3\theta}{\theta} \cos \theta$	M3.02	U
7	Find the derivative of $\sqrt{x} e^x$	M3.04	U
8	If $x = at^2, y = 2at$ then find $\frac{dy}{dx}$	M4.02	U
9	Find $\frac{dy}{dx}$ if $xy = c$ where $c$ is a constant.	M4.02	U
10	If $y = e^x + e^{-x}$ then $\frac{d^2y}{dx^2} = y$	M4.03	A



**(PART C)**

**Answer all questions. Each question carries seven marks**

**(6 x 7 = 42 Marks)**

Module outcome      Cognitive level

III.	i) Find the product of the complex numbers $1 + 2i$ and $2 - 3i$ (4 marks) ii) Find the modulus and amplitude of the complex number $2 + 2i$ (3 marks)	M1.01	R
<b>OR</b>			
IV.	(i) Find the equation to the line perpendicular to $3x - y + 5 = 0$ and passing through $(3, -2)$ (4 marks) (ii) Find the angle between the straight lines with slope $\sqrt{3}$ and $\frac{1}{\sqrt{3}}$ (3 marks)	M1.04	R
V.	Evaluate $(3 + i)(2 - i) + (5 + 3i)(-1 + i) - (3 - 2i)$ (7 marks)	M1.01	R
<b>OR</b>			
VI.	(i) Write the equation of a line passing through $(3, 4)$ and $(5, 6)$ (4 marks) (ii) Find the point of intersection of the straight lines $y = 4 - x$ and $y = 2x + 3$ (3 marks)	M1.02	R
VII.	Prove that $\frac{\operatorname{cosec} \theta}{\operatorname{cosec} \theta - 1} + \frac{\operatorname{cosec} \theta}{\operatorname{cosec} \theta + 1} = 2 \sec^2 \theta$ (7 marks)	M1.03	R
<b>OR</b>			
VIII.	Prove that $\cos 20^\circ \cos 40^\circ \cos 60^\circ \cos 80^\circ = \frac{1}{16}$ (7 marks)	M2.02	U
IX.	Find (i) $\lim_{x \rightarrow 2} \frac{x^4 - 16}{x^3 - 8}$ (ii) $\lim_{x \rightarrow 1} \frac{x^2 + 4x - 5}{x^2 + x - 2}$ (4+3marks)	M2.03	A
<b>OR</b>			
X.	i) Find the derivative of $\sec x$ using quotient rule. (5 marks) ii) Find the derivative of $4 \sin x - 3 \cos x$ . (2 marks)	M3.02	U
		M3.04	U
		M3.03	U



XI.	Find (i) $\lim_{x \rightarrow 0} \frac{1 - \cos 2x}{x^2}$ (ii) $\lim_{x \rightarrow 2} \frac{x^2 + 2x}{x+2}$ (5+2 marks)  <b>OR</b>	M3.02 M3.01	U U
XII.	Find the derivative of the following functions. i) $\frac{\log x}{x}$ ii) $x^2 \tan^{-1} x$ (4+3 marks)	M3.04	U
XIII.	Find the derivative of i) $e^{2x} \cos 3x$ ii) $\log(\sec x + \tan x)$ (4+3 marks)  <b>OR</b>	M4.01	U
XIV.	(ii) If $y = x \cos x$ then prove that $\frac{d^2 y}{dx^2} + y + 2 \sin x = 0$ (7 marks)	M4.04	A

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