TED (21) 1002

(Revision-2021)

N22-2102220004 A

Reg.No.....

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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 $\lim_{x\to 2} 5x-1$	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 $\lim_{\theta\to 0} \frac{sin3\theta}{\theta}\ cos\theta$	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 +2 i and $2 - 3i$ (4 marks) ii) Find the modulus and amplitude of the complex number $2+2i$ (3 marks)	M1.01	R
	OR		
IV.	(i)Find the equation to the line perpendicular to $3x - y + 5 = 0$ $and\ passing\ through$ $(3, -2)$ (4 marks)	M1.04	R
	(ii)Find the angle between the straight lines with slope $\sqrt{3}$ and $\frac{1}{\sqrt{3}}$ (3 marks)	M1.03	R
V.	Evaluate $(3 + i)(2 - i) + (5 + 3i)(-1 + i) - (3 - 2i)$ (7 marks)	M1.01	R
	OR		
VI.	(i) Write the equation of a line passing through (3,4) and (5,6) (4 marks)	M1.02	R
	(ii) Find the point of intersection of the straight lines $y = 4 - x$ and $y = 2x + 3$ (3 marks)	M1.03	R
VII.	Prove that $\frac{cosec\ \theta}{cosec\theta - 1} + \frac{cosec\ \theta}{cosec\theta + 1} = 2sec^2\ \theta$ (7 marks)	M2.02	U
	OR		
VIII.	Prove that $\cos 20^0 \cos 40^0 \cos 60^0 \cos 80^0 = \frac{1}{16}$ (7 marks)	M2.03	A
IX.	Find (i) $\lim_{x \to 2} \frac{x^4 - 16}{x^3 - 8}$ (ii) $\lim_{x \to 1} \frac{x^2 + 4x - 5}{x^2 + x - 2}$ (4+3marks)	M3.02	U
	OR		
X.	i) Find the derivative of *sec x* using quotient rule. (5 marks)	M3.04	U
	ii) Find the derivative of 4 *sin x* -3 *cos x.* (2 marks)	M3.03	U

XI.	Find (i) $\lim_{x\to 0} \frac{1-cos2x}{x^2}$ (ii) $\lim_{x\to 2} \frac{x^2+2x}{x+2}$ (5+2 marks)	M3.02 M3.01	U U
	OR		
XII.	Find the derivative of the following functions. i) $\frac{logx}{x}$ ii) $x^2 tan^{-1}x$ (4+3 marks)	M3.04	U
XIII.	Find the derivative of i) $e^{2x}\ cos3x$ ii) $\log(secx + tanx)$ (4+3 marks)	M4.01	U
	OR		
XIV.	(ii) If $y = x\ cosx\ then$ prove that $\frac{d^2y}{dx^2} + y + 2\ sinx = 0$ (7 marks)	M4.04	A

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