TED (21)1002
(Revision – 2021)

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, NOVEMBER – 2024

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.	Find the conjugate of the complex number $1-i$	M1.01	U
2.	Find the slope of the straight line $3x - 2y + 1 = 0$	M1.02	U
3.	Evaluate sin 90° x cos 0°	M2.01	U
4.	Find the value of $\sin 135^0$	M2.02	R
5.	Write the expression for *sin 2A* in terms of *tan A*	M2.03	R
6.	Find $\lim_{\theta \to 0} \cos \theta$	M3.01	U
7.	Find $\frac{dy}{dx}$ if $y=e^x - \log x$	M3.03	U
8.	Find $\frac{dy}{dx}$ if $x^2+y=1$	M4.02	A
9.	Find the second derivative of *log 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.	Multiply $(3 + i)$ with its conjugate.	M1.01	R
2.	Find the equation of the line with x intercept 3 and passing through the point $(-2, 3)$	M1.02	U
3.	If sec $\theta = 2$ then find tan θ and cot θ	M2.02	R
4.	If tan A= 2 and tan B = 1 then find tan(A+B) and tan (A− B)	M2.03	U
5.	Prove that $(\cos A + \sin A)^2 = 1 + \sin 2A$	M2.03	U
6.	Show that $\lim_{\theta \to 0} \frac{\tan \theta}{\theta} = 1$	M3.02	U
7.	Find the derivative of $x \sin^{-1} x$.	M3.04	A
8.	If $x = 2t^3$, $y = 4t^2$ then find $\frac{dy}{dx}$.	M4.02	U
9.	Find $\frac{dy}{dx}$ if $x^3+y^3=3x$	M4.02	U
10.	If $y = \sin x + \cos x$ *then show that* $\frac{d^2y}{dx^2} + y = 0$	M4.03	A

PART-C

Answer all questions from the following. Each question carries *'seven'* marks

(6 x 7 = 42 Marks)

			Module Outcome	Cognitive level
III.	i)	Multiply the complex numbers 3 + 2 *i* with itself. (4 marks)	M1.01	R
	ii)	Find the modulus and amplitude of the complex number $3-4i$ (3 marks)	M1.01	R
		OR		
IV.	i)	Find the equation to the line parallel to $3x - y + 5 = 0$ and passing through $(3, -2)$ (4 marks)	M1.04	U
	ii)	Find the point of intersection of the lines x +y = 4 and $x - y = 7$ (3 marks)	M1.03	U
V.	i)	Evaluate $(1+ 2i)(2 - i) + (1 - 3i)(2 + i) - (5 - 2i)$.	M1.01	R
		OR		
VI.	i)	Find the angle between $x - y + 1 = 0$ and $\sqrt{3}x + y + \sqrt{2} = 0$. (4 marks)	M1.03	R
	ii)	A straight line is inclined 45° with X-axis and passes through (3, -4). Find the equation. (3 marks)	M1.02	R
VII.	i)	If $cos\theta = -\frac{4}{5}, \theta$ lies in the second quadrant then find all other trigonometric functions.	M2.02	U
	ii)	Prove that $\frac{1+cos2A}{sin2A} = cotA$ (5+2 marks)	M2.03	U
		OR		
VIII.		Prove that i) $\sin(A + B) - \sin(A - B) = 2 \cos A \sin B$	M2.03	R
		ii) $\frac{sin3x}{sinx} - \frac{cos3x}{cosx} = 2$ (3 +4 marks)	M2.03	R
IX.		Find i) $\lim_{x\to 0} \frac{sin2x}{sin4x}$	M3.02	U
		ii) $\lim_{x\to 3} \frac{x^3-27}{x^2-9}$ (3+4 marks)	M3.02	U
		OR		
X.		i) Find the derivative of *tan x* using quotient rule. (5 marks)	M3.04	A
		ii) Find the derivative of $x^3 - 3\sqrt{x} + 5$ (2 marks)	M3.03	A

XI.	Find i) $\lim_{x\to 2} \frac{x^2-5x+6}{x^2+x-6}$	(4 marks)	M3.02	U
	ii) $\lim_{x-0} \frac{sin3x}{x} \cos x$	(3 marks)	M3.02	U
	OR			
XII.	Find the derivative of the following functions			
	i) $\frac{x+1}{x-1}$	(4 marks)	M3.04	U
	ii) $x\ cosec\ x$	(3 marks)	M3.04	U
XIII.	Find the derivative of			
	i) $e^{2x} \sin 2x$	(4 marks)	M4.01	A
	ii) $\frac{\sin(logx)}{x}$	(3 marks)	M4.01	A
	OR			
XIV	Find $\frac{dy}{dx}$ if i) $x^2 + xy + y^2 = 0$	(4 marks)	M4.02	U
	ii) $x = t - sin\ t, y = 1 - \cos t$	(3 marks)	M4.02	U

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