



TED (21) 1002
(Revision-2021)

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**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE, NOVEMBER - 2021**

MATHEMATICS - I

[Maximum marks: 75]

(Time: 3 Hours)

PART A

I. Answer all the following questions in one word or one sentence.

(9 x 1 = 9 Marks)

Module outcome Cognitive level

1	Find the conjugate of $4+3i$	M1.01	U
2	Write the equation to a straight line having slope = $\frac{1}{2}$ and y- intercept = -3	M1.02	U
3	Evaluate $\tan^2 60^\circ + \tan^2 45^\circ$	M2.02	R
4	Write the formula for $\tan(A+B) =$	M2.03	U
5	Write the expression for $\sin 3A$	M2.03	R
6	Evaluate $\lim_{x \rightarrow 0} \frac{2 + 3x}{4 - 5x}$	M3.01	U
7	Find $\frac{dy}{dx}$ if $y = \sin x + e^x$	M3.03	U
8	Find $\frac{dy}{dx}$ if $x.y=c$	M4.02	A
9	If $y = e^x$, find $\frac{d^2y}{dx^2}$	M4.03	A

PART B

II. Answer any eight questions from the following.

(8 x 3 = 24 Marks)

Module outcome Cognitive level

1	Find the modulus and amplitude of $1+\sqrt{3}i$	M1.01	U
2	Find the equation to a straight line passing through two given points(2, - 1) and (-6, 3)	M1.02	U
3	If $\tan\theta=3$, θ is acute, find $\sin\theta$ and $\cos\theta$	M2.02	R
4	If $\tan A=1/2$, $\tan B=1/3$, A and B are acute angles, Show that $A+B=45^\circ$	M2.02	U
5	Prove that $\sin A=0.6$, A is acute find $\sin 2A$	M2.03	U
6	Evaluate $\lim_{\theta \rightarrow 0} \frac{\sin 5\theta}{2\theta}$	M3.02	R



7	Differentiate $y = e^x \cdot \sec x$ w.r.to x	M3.04	A
8	Find $\frac{dy}{dx}$ if $x^3 + y^3 = a^3$	M4.02	R
9	If $x = a \cos t$, $y = b \sin t$, find $\frac{dy}{dx}$	M4.02	U
10	Find the second derivative of $y = x \cdot \sin x$	M4.03	A

PART C

III. Answer all questions. Each question carries seven marks

(6 x 7 = 42 Marks)

Module outcome Cognitive level

1.	Multiply (i) $(2+3i)(1-4i)$ (ii) $(2-i)(3+i)$ (4+3 marks)	M1.01	R
2.	OR (i) Find the equation to a straight line parallel to $3x-2y=5$ and passing through the point $(1,-2)$ (ii) Find the angle between the lines having slope 2 and $1/3$ (4+3 Marks)	M1.04 M1.03	U
3.	Find the modulus and amplitude of (i) $-1-2i$ (ii) $-2+3i$ (4+3marks)	M1.01	R
4.	OR (i) Find the equation to a straight line having slope $1/3$ and passing through the point $(-2,4)$ (ii) Find the slop of the line joining the points $(2,-3)$ and $(6,2)$ (4+3marks)	M1.02	U
5.	If $\tan A = 5/12$, A lies in the third quadrant, Find all other T-functions.	M2.02	R
6.	OR Show that $\tan 15^\circ + \cot 15^\circ = 4$ without using tables (4+3marks)	M2.03	U
7.	Evaluate (i) $\lim_{x \rightarrow 2} \frac{x^5 - 32}{x^3 - 8}$	M3.02	R



8.	<p>(ii)</p> $\lim_{x \rightarrow 2} \frac{3x^2 + 5}{x^2 - 2}$ <p>(5+2marks)</p> <p>OR</p> <p>Differentiate w.r.to x</p> <p>(i) $y=x^2 \cdot \log x$</p> <p>(ii) $y = \frac{\cos x}{x + \sin x}$</p> <p>(4+3 marks)</p>	M3.04	U
9.	<p>Evaluate (i) $\lim_{x \rightarrow 0} \frac{3 \sin 2x \cdot \cos x}{5x}$</p> <p>(ii) $\lim_{x \rightarrow 1} \frac{x-1}{x^2-1}$</p> <p>(4+3 marks)</p> <p>OR</p> <p>10. Find the derivative of $\sec x$ and $\operatorname{cosec} x$ using quotient rule.</p> <p>(4+3 marks)</p>	M3.02	U
11.	<p>Differentiate w.r.to x</p> <p>(i) $y=(x^2 + 1)^{10} \cdot \sec 5x$</p> <p>(ii) $y = \frac{\sin(\log x)}{x}$</p> <p>(4+3 marks)</p> <p>OR</p>	M4.01	U
12.	<p>(i) If $x = a \sec \theta$, $y = b \tan \theta$, find $\frac{dy}{dx}$</p> <p>(ii) If $y = a \sin x + b \cdot \cos x$, prove that $\frac{d^2y}{dx^2} + y = 0$</p> <p>(4+3 marks)</p>	M4.02 M4.03	A
