



TED (21) 1002

(Revision-2021)

2102220003A

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Reg.No.....

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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 slope 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> | M3.02 | U |
| 10. | <p>Find the derivative of $\sec x$ and $\csc x$ using quotient rule.</p> <p>(4+3 marks)</p> | M3.04 | A |
| 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 $\frac{d^2 y}{dx^2} + y = 0$</p> <p>(4+3 marks)</p> | M4.02 M4.03 | A |
