SCHEME OF VALUATION
(Scoring Indicators)

Revision : 2015 Course Code : 1002

Course Title : ENGINEERING MATHEMATICS - I

Qst No	Scoring Indicator	Split Up Score	Sub Total	Total
	PART - A			
I.1	$\lim_{x \to 2} \frac{x\sqrt{x} - 2\sqrt{2}}{x-2} = \frac{3\sqrt{2}}{2}$	2	2	
I.2	Expansion Use of squared relation	1 1	2	
I.3	Let 'x' be the side of a cube Volume $V = x^3$ $\frac{dV}{dx} = 3x^2$	1 1	2	10
I.4	$y = \sin x \cdot \cos x$ $\frac{dy}{dx} = \cos 2x$ $\frac{d^2y}{dx^2} = -2\sin 2x$	1 1	2	
I.5	Formula of $\tan 2A$ Correct answer	1 1	2	

PART - B

II.1	Let $y = \cos x$		
	$\frac{\Delta y}{\Delta x} = -\sin\left(x + \frac{\Delta x}{2}\right) \cdot \frac{\sin\left(\frac{\Delta x}{2}\right)}{\frac{\Delta x}{2}}$	2	
	$\frac{dy}{dx} = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x}$	1	6
	Correct derivation	2	
	$\frac{d}{dx}(\cos x) = -\sin x$	1	
II.2	$s = a \cdot e^{2t} + b \cdot e^{-2t}$		
	$v = \frac{ds}{dt} = 2ae^{2t} - 2be^{-2t}$	3	6
	$a = \frac{dv}{dt} = \frac{d^2}{dt^2}(s) = 4 \cdot s$	3	
II.3	$y = 2x^3 - 9x^2 + 12x$		
	Find $\frac{dy}{dx}$	1	30
	Correct roots of $\frac{dy}{dx} = 0$, $x = 1$ or $x = 2$	1	6
	check $\frac{d^2y}{dx^2}$ is negative or positive	3	
	Maximum deflection correct answer = 5	1	
II.4	Let $R \sin(x + \alpha) = 4\cos x + 3\sin x$		
	steps for finding R and α	2	
	correct value of $R = \pm 5$	1	6
	Correct value of $\alpha = (53.13)^\circ$	2	
	Correct answer.	1	
II.5	Correct proof		
	6 steps	6	6
II.6	Apply sine & cosine rule	2	
	simplification	3	6
	Correct answer	1	

II-7	i) Apply reduction formula	1		
	Apply product formula	1		
	Correct answer	1		
	ii) Apply product formula	2	6	
	Correct answer	1		
	PART - C			
	UNIT - I			
III-1	$L.H.S = \frac{1-\tan A}{1+\tan A}$	2		
	$R.H.S = \frac{1-\tan A}{1+\tan A}$	2	5	
	Correct answer	1		
III-2	Value of $\tan 75^\circ = 2+\sqrt{3}$	3		
	value of $\cot 75^\circ = 2-\sqrt{3}$	1	5	
	Addition & Correct answer	1		
III-3	Correct value of $\sin A$, $\cos A$, $\cos B$	3		30
	Formula for $\sin(A-B)$ & answer.	1	5	
	Formula for $\cos(A+B)$ & correct answer	1		
IV-1	Values of $\sin 240$, $\sin 210$, $\cos 330$, $\cos 120$	4	5	
	Correct answer	1		
IV-2	Expansion of $(\cot A-1)^2$ & $(\cot A+1)^2$	2		
	Addition	1	5	
	Correct answer	1		
IV-3	Cross multiplication	1		
	Expansion	3	5	
	Correct answer	1		
	UNIT II			
V-1	Rearrange given terms in Nr & Dr.	1		
	Apply product formula & simplification	3	5	
	Correct answer	1		

V-2	Expansion	1		
	Apply Cosine formula	1	5	
	Addition	2		
	Correct answer	1		
V-3	Correct value of Cos A & A using Cosine formula = 34° 3'	2		
	Cos B & B = 44° 25'	2	5	
	Angle C = 101° 32'	1		
VI-1	Apply Converse of product formula	1		
	Correct 6 steps	3	5	
	Answer	1		30
VI-2	Correct value of side a = 4.44 c.m	2		
	Value of angle B = 115° 44' using sine formula	2	5	
	correct value of angle C = 34° 16'	1		
VI-3	Formula for Sin 3A	1		
	Formula for Cos 3A	1	5	
	Simplification	2		
	Correct answer	1		
	UNIT - III			
VII-1	Let $y = 1-\cos\theta$, $x = \theta + \sin\theta$	2		
	$\frac{dy}{d\theta}$ & $\frac{dx}{d\theta}$		5	
	Formula of $\frac{dy}{dx}$	1		
	Simplification	2		
VII-2	y'	2		
	y''	2	5	
	Answer	1		
VII-3	Apply Quotient rule	1		
	Correct answer with steps	4	5	

VIII - 1	Substitution	1		
	Apply reduction formula	1		
	change limit	1		
	Apply $\lim_{x \to 0} \frac{\sin x}{x} = 1$	1	5	
	Correct answer	1		
VIII - 2	Apply quotient rule	1		
	Derivative of $\cos 3x$ & e^{3x}	2	5	30
	Simplification & Correct answer	2		
VIII - 3	Correct derivative of each terms	2		
	Rearrangement & find $\frac{dy}{dx} = -\frac{x+g}{y+f}$	3	5	
	UNIT - IV			
IX - 1	Formula of perimeter & area of a rectangle	1		
	Substitution	1		
	$\frac{dA}{dx}$	1	5	
	$\frac{d^2A}{dx^2} < 0$	1		
	Find rectangle = square	1		
IX - 2	Let $y = x^3 - 3x^2 - 9x + 5$			
	$\frac{dy}{dx}$	1		
	Conditions for turning points	1	5	
	Values of x	1		
	Correct turning points	2		
IX - 3	Formula of volume & surface area of a sphere	1		
	$\frac{dV}{dt}$ & $\frac{ds}{dt}$. Find $\frac{dr}{dt}$	3	5	
	$\frac{ds}{dt}$ when $r = 15$ c.m with units	1		

X-1	Area of the outermost ripple	1		
	$\frac{dr}{dt}$ & $\frac{dA}{dt}$	3	5	
	$\frac{dA}{dt}$, when $r = 24 c.m$	1		
X-2	Let $y = \cos x$			
	$\frac{dy}{dx}$ and $\left(\frac{dy}{dx}\right)_{x=\pi/6}$	1		
	Correct value of y when $x = \pi/6$	1	5	30
	Equation of the tangent	1		
	Slope of the normal & equation of the normal	2		
X-3	Velocity formula & correct derivative	2		
	Acceleration formula & correct derivative	2	5	
	Value of time when acceleration $= 12 cm/sec^2$	1		