

ENGG MATHS-I [15SC01M]

Unit – 1[Matrices and determinants]			
1.	If $A = \begin{bmatrix} 5 & -2 \\ -7 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 1 \\ -1 & 4 \end{bmatrix}$. Find $A+B$.	3M	May- 2018
2.	If $A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$. Find A^2	3M	May- 2018
3.	$A = \begin{bmatrix} 3 & 2 \\ 4 & 5 \end{bmatrix}$. Find characteristic equation.	3M	May- 2018/Dec-2015
4.	If $A = \begin{bmatrix} 3 & -9 \\ -4 & 7 \end{bmatrix}$, find $A + A'$	3M	Dec-2015
5.	If $A = [2 \quad -1 \quad 3]$ and $B = \begin{bmatrix} 5 & -2 \\ 3 & 1 \\ 2 & 4 \end{bmatrix}$, find AB matrix	3M	May-2017
6.	If matrix $A = \begin{bmatrix} 2 & -1 & 3 \\ 5 & 1 & 0 \\ 1 & 0 & x \end{bmatrix}$ is a singular matrix, then find the value of x	3M	May-2016
7.	Find the adjoint of the matrix $A = \begin{bmatrix} 4 & -5 \\ 3 & -2 \end{bmatrix}$.	3M	May-2016/Dec-2015
8.	If $A = \begin{bmatrix} 3 & -1 \\ 0 & -2 \end{bmatrix}$ find the characteristic equation	3M	Dec-2015/Dec-2017/ Nov-2018
9.	Find x if $\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & x \\ 7 & 8 & 9 \end{vmatrix} = 0$	3M	May-2017
10	Find AB if $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 6 \\ 7 & 8 \end{bmatrix}$.	3M	Dec-2017
11.	Find $A^T + B^T$ if $A = \begin{bmatrix} 1 & 5 \\ 3 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 5 \\ 2 & 8 \end{bmatrix}$.	3M	Dec-2017
12	If $A = \begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 3 & 2 \\ -1 & 4 \end{bmatrix}$, find $3A+2B$.	3M	Dec-2016/ Nov-2018/ May-2019
13	If $A = \begin{bmatrix} 3 & 1 \\ -1 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 3 \\ 0 & -1 \end{bmatrix}$, find adjoint of AB .	3M	Dec-2016
14	If $A = \begin{bmatrix} 3 & -2 \\ 4 & -1 \end{bmatrix}$, find $A(A^T)$	3M	May-2019
15	If $A = \begin{bmatrix} 2 & -2 \\ 4 & 1 \end{bmatrix}$ find $A(\text{Adj}A)$	3M	May-2019
1	Solve the equation $x+y=3$, $2x+3y=8$ by determinant method.	5M	May- 2018
2.	Verify Cayley Hamilton theorem for the matrix. $A = \begin{bmatrix} 2 & -1 \\ 3 & 2 \end{bmatrix}$.	5M	May- 2018/Dec-2015
3	Verify Cayley-Hamilton Theorem for the matrix $A = \begin{bmatrix} 2 & -1 \\ 1 & 5 \end{bmatrix}$	5M	Dec-2015
4	Find the product of $A = \begin{bmatrix} 2 & 3 & 1 \\ 0 & -1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 4 \\ -1 \\ 5 \end{bmatrix}$	5M	Dec-2016/ Nov-2018
5	Solve for x, y & z using determinant method $x + y = 0$, $y + z = 1$ & $z + x = 3$	5M	Dec-2016
6	Find the inverse of the matrix $\begin{bmatrix} 1 & 2 & 2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$	5M	May-2017

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7	Find the characteristic equation and its roots of a square matrix $A \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$	5M	Dec-2015/Dec-2016
8	Solve for y using deerminants and find value of x & z by substitution $x+y-z=0$ $4x-y=3$ $y+z=3$	5M	Dec -2016/Dec-2017
9	Solve for x, if $\begin{vmatrix} 1 & 5 & 7 \\ 2 & x & 14 \\ 3 & 1 & 2 \end{vmatrix} = 0$	5M	Dec-2015/Dec-2016/ Nov-2018
10	Verify Cayley-Hamilton theorem if $A = \begin{bmatrix} 1 & 3 \\ 2 & -4 \end{bmatrix}$	5M	May-2016/ Nov- 2018/May-2019
11	Verify $A(\text{Adj}A) = A .I$. if $A = \begin{bmatrix} 5 & -2 \\ 3 & 1 \end{bmatrix}$.	5M	May-2016/ Nov-2018
12	Find the adjoint of the matrix $A = \begin{bmatrix} 3 & -1 & 2 \\ 2 & -3 & 1 \\ 0 & 4 & 2 \end{bmatrix}$	5M	Dec-2015
13	Find the inverse of the matrix $A = \begin{bmatrix} 1 & 2 & 5 \\ 0 & -1 & 3 \\ 3 & 1 & 2 \end{bmatrix}$	5M	Dec-2016
14	Find the inverse of the matrix $A = \begin{bmatrix} 5 & 2 \\ 3 & 6 \end{bmatrix}$.	5M	Dec-2017
1	Find the value of x, if the $\begin{vmatrix} 2 & 3 & 4 \\ -4 & x & -8 \\ 5 & 6 & 7 \end{vmatrix} = 0$.	6M	May- 2018
2	If $A = \begin{bmatrix} 6 & 3 \\ 6 & 5 \end{bmatrix}$, find $A(\text{adj}A)$.	6M	May- 2018
3	Solve for x, y & z using determinant method $x + y = 0$, $y + z = 1$ & $z + x = 3$	6M	May-2018
4	Find the inverse of the matrix $\begin{bmatrix} 1 & 2 & 2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$	6M	May-2017
5	Find the equation to the median of the triangle through the vertex A with vertices A(-1,3), B(-3,5) & C(7,-9)	6M	May-2017
6	Solve for x & y from the equations $4x + y = 7$, $3y + 4z = 5$, $5x + 3z = 2$ by Cramer's rule	6M	May-2017/Dec2016
7	Prove that $\text{adj}(AB) = (\text{adj}B) \cdot (\text{adj}A)$ if $A = \begin{bmatrix} -1 & 0 \\ 5 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 5 \\ 2 & 4 \end{bmatrix}$	6M	Dec-2016
8	Find the characteristic roots of a matrix $\begin{bmatrix} 1 & -1 \\ -6 & -2 \end{bmatrix}$	6M	Dec-2016
9	If $A = \begin{bmatrix} 1 & -2 \\ 3 & 5 \end{bmatrix}$, Find $A \cdot \text{adj}(A)$	6M	Dec-2016

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10	1. Solve the following equations by cramer's rule $2x + y = 1, y + 2z = 7$ and $3z - 2x = 11$	6M	Dec-2015
11	IF $\begin{vmatrix} 2 & m-1 & -3 \\ 1 & -2 & 4 \\ 3 & -1 & 5 \end{vmatrix} = 3m-1$, find the value of m.	6M	Dec 2015
12	Solve for y & x from the equations $6x - 5y + 2z = 3, 5x + y - 2z = 4,$ $x + y + 3z = 5$ by Cramer's rule	6M	May-2017
13	Find the inverse of $A = \begin{bmatrix} 3 & 1 & 2 \\ -2 & 1 & 1 \\ 3 & 0 & 2 \end{bmatrix}$	6M	Dec-2016/ May-2019
14	Solve the equations $4x-2y=2, 3x+y=14$ by using Crammer's rule.	5M	May-2019
15	Solve for x and y using determinat method $x+y+z=0, 2x+5y-9=0$ & $4y-7z+19=0$.	6M	May-2019
Unit-2[Vectors]			
1.	If $\vec{a} = 2i+5j-6k, \vec{b} = 5i-j+2k$. Find $\vec{a} \cdot \vec{b}$.	3M	May- 2018
2.	Find unit vector in the direction of $\vec{a} = 5i-j+2k$.	3M	May- 2018
3.	Find the magnitude of vector $2i + 3j - 6k$	3M	May-2017
4.	If $\vec{a} = i + 2j - 3k, \vec{b} = 3i - 5j + 2k$ find $ \vec{3a} - \vec{2b} $	3M	May-2017/ May-2019
5.	Show that $\cos \theta i - \sin \theta j$ is unit vector	3M	Dec-2016
6.	Show that the vectors $2i + 5j - 6k,$ and $7i + 2j + 4k$ orthogonal vectors.	3M	Dec-2015
7.	find the value of λ if $\vec{a} = 2i+3j-4k, \vec{b} = 4i-2j+\lambda k$ are perpendicular.	3M	Nov-2018
8	If $\vec{a} = i+2j+k$ and $\vec{b} = 2i + 4j - k$ & $\vec{c} = 2i + 2j - k$, find $(\vec{a} + \vec{b}) \cdot \vec{c}$	3M	May-2019
1	If $\vec{a} = 3i-j+\lambda k, \vec{b} = -3i+3j-4k$ are orthogonal, find the value of λ .	5M	May- 2018
2	Find the workdone by the force $\vec{F} = 5i+3j+7k$ in moving a particle from the point A(1,2,-1) to B(3,1,-4).	5M	May-2017/Nov-2018
3	Find the <i>sine</i> of the angle between the vectors $2i - j + 3k$ and $i - 2j + 2k$	5M	May-2017/Nov-2018
4	Find the projection of $\vec{a} = 2i + j - k$ on $\vec{b} = 2i - 3i + 4k$	5M	Dec-2016/Dec-2017
5	A force $\vec{F} = 2i + j + k$ is acting at the point (-3,2,1). Find the magnitude of the moment of force \vec{F} about the point (2,1,2).	5M	Dec-2016
6	Find cosine of the angle between the vectors $4i - 2j - 3k$ and $2i - 3j + 4k$.	5M	Dec-2016/Nov-2018
7	Find the projection of \vec{b} on \vec{a} if $\vec{a} = 5i + 2j - 4k$ and $\vec{b} = 2i - 5j + 6k$.	5M	Dec-2015
8	Find the projection of vector $2i + 3j + 2k$ on $4i + 5j + 3k$	5M	May-2017
9	If $\vec{a} = 3i + 2j - 4k$ and $\vec{b} = i - 2j + 5k$ are two sides of a triangle, find	5M	May-2017/Nov-2018

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	its area.		
10	Simplify $(\vec{a} + \vec{b}) \cdot (\vec{a} - \vec{b})$ and $(\vec{a} + \vec{b}) \times (\vec{a} - \vec{b})$.	5M	Dec-2015
11	Find the magnitude of moment of force $4i - 2j + 5k$ about $(2,5,-7)$ acting at $(4,7,0)$	5M	Dec-2016/ May-2019
12	Find cosine of the angle between the vectors $4i - 2j - 3k$ and $2i - 3j + 4k$.	5M	Dec-2016/ May-2019
13	Find the projection of \vec{b} on \vec{a} if $\vec{a} = 5i + 2j - 4k$ and $\vec{b} = 2i - 5j + 6k$.	5M	Dec-2015
14	Find the area of parallelogram, whose adjacent sides are $3i+2j-k$ and $i+2j+3k$.	5M	Dec 2015/Dec-2016
15	Find $ \vec{a} \times \vec{b} $ if $\vec{a} = 3i-2j+k$ and $\vec{b} = i+3j - k$.	5M	Dec-2017
16	Show that the position vectors of the points $2i+3j+5k$, $3i+5j+2k$ and $5i+2j+3k$ form an equilateral triangle.	5M	May-2019
1	If $A=(2,5,7)$, $B=(3,9,4)$ and $C=(-2,5,7)$ are three vertices of parallelogram find its area.	6M	May-2018
2	If a force $4i + 6j + 2k$ acting on a body displaces it from $(2,7,-8)$ to $(3,9,4)$. Find the work done by the force.	6M	May-2017
3	Find the sine of the angle between the vectors $4i - 2j - 3k$ and $2i - 3j + 4k$.	6M	Dec-2016
4	Find the unit vector in the direction perpendicular to both vector $2i - 5j + k$ and $5i + j + 7k$.	6M	Dec-2016/ May-2019
5	Show that the points whose position vectors are $i - 3j - 5k$, $2i - j + k$ and $3i - 4j - 4k$ form a right angled triangle	6M	Dec-2015
6	If $A=(2,5,7)$, $B=(3,9,4)$ and $C=(-2,5,7)$ are three vertices of parallelogram find its area.	6M	Dec-2015
Unit-3[Probability and Logarithms]			
1.	A die is thrown once, what is the probability of an odd number appears?	3M	May- 2018
2.	Three coins are tossed simultaneously. List the sample space for event	3M	May-2017
3.	Define equally likely events, Independent event, and mutually exclusive event.	3M	Dec-2016
4.	Define probability of an event.	3M	Dec-2016
5.	A coin is tossed twice. What is the probability that at least one head occurs.	3M	Dec-2015/Dec-2017 /Nov-2018/ May-2019
6.	A die is thrown once, what is the probability an odd number appears	3M	Dec-2015
7.	Define equally likely events, Independent event, and mutually exclusive event.	3M	Dec-2015
1	Prove that $\log_y x^3 * \log_z y^4 * \log_x z^5 = 60$.	5M	May- 2018
2	Prove that $\frac{1}{\log_a abc} + \frac{1}{\log_b abc} + \frac{1}{\log_c abc} = 1$	5M	May-2017
4.	$\log_4 2 + \log_8 2 + \log_{16} 2 = 13/12$	5M	

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5.	If $x = \log_{2a} a, y = \log_{3a} 2a, z = \log_{4a} 3a$, prove that $xyz + 1 = 2yz$.	5M	Dec-2016
6	If $a^2 + b^2 = 7ab$, prove that $\log\left(\frac{a+b}{3}\right) = \frac{1}{2}(\log a + \log b)$	5M	Dec-2015
7	If $\log_a(bc) = x, \log_b(ac) = y$ and $\log_c(ab) = z$. Show that $\frac{1}{1+x} + \frac{1}{1+y} + \frac{1}{1+z} = 1$	5M	Dec-2015
8	If $\log\left(\frac{a+b}{3}\right) = \frac{1}{2}(\log a + \log b)$, show that $a^2 + b^2 = 7ab$	5M	Dec-2015
9	Show that $2\log\frac{16}{15} + \log\frac{25}{24} - \log\frac{32}{27} = 0$	5M	Dec-2017
	$\log_2 2 - \log_4 2 + \log_8 2 - \log_{16} 2 = 7/12$	5M	May-2019
1	A family has two children. What is the probability that both are boys given that youngest is a boy?	6M	May- 2018/Dec-2017
2	An integer is chosen at random from the numbers ranging from 1 to 50 . What is the probability that the integer chosen is a multiple of 3 or 10 ?	6M	May-2017
3	Two unbiased dice are thrown once . Find the probability of getting the sum of the numbers obtained on the two dice is neither a multiple of 2 nor a multiple of 4	6M	Dec-2016
4	A pair of dice is thrown once. If the two numbers appearing on them are different, find the probability that the sum of the numbers is 6	6M	Dec-2015
5	There are 20 boys and 30 girls in a class. A student is chosen at random. Find the probability that chosen student (i) a boy (ii) a girl	6M	Nov-2018
6	A dice is thrown once. Find the probability of getting: (i) A prime number (ii) A number greater than 4.	6M	May-2019
Unit-4[Allied angles and compound angles]			
1.	If $\sin\theta = 3/5$, θ is acute angle find $\cos \theta + \tan \theta$.	3M	May- 2018 /Nov-2018
2.	Find the value of $\sin 5\pi/6 + \cos 5\pi/6$.	3M	May- 2018
3.	If $\sin \theta = \frac{1}{2}$ and $\frac{\pi}{2} < \theta < \pi$, find $\cos \theta$	3M	May-2017
4.	If $A+B+C = 180^\circ$ Prove that $\cot\left(\frac{A+B}{2}\right) = \tan C/2$	3M	Dec-2016
5.	Find the value of $\tan\left(\frac{7\pi}{3}\right)$	3M	Dec-2016
6.	If $\sin \theta = \frac{1}{2}$ and $\frac{\pi}{2} < \theta < \pi$, find $\cos \theta$	3M	Dec-2015
7.	Find the value of $\sin 15^\circ$	3M	Dec-2015
8	Show that $\cos(A+B) + \cos(A-B) = 2 \cos A \cdot \cos B$	3M	Dec-2017
9	Find the value of $\sin(270^\circ - \theta) \cdot \cos(180^\circ - \theta)$	3M	May-2019
10	Find the value of $\sec(-810^\circ) + \cos 0^\circ$	3M	May-2019
11	Prove that $\sin 2A = 2 \sin A \cos A$	3M	May-2019
12	Prove that $\tan(45^\circ + \theta) = \frac{1 + \tan \theta}{1 - \tan \theta}$	3M	May-2019

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1	Prove that $\frac{\operatorname{cosec}(180-\theta) \cdot \cos(\theta)}{\sec(180+\theta) \cdot \cos(90+\theta)} = \cot^2 \theta$	5M	May- 2018/Dec-2017
2	Prove that $\frac{\sin 5A + \sin 3A}{\sin 5A - \sin 3A} = \tan 4A \cdot \cot A$	5M	May- 2018
3	Show that $\tan(45^\circ + \theta) = \frac{1 + \tan \theta}{1 - \tan \theta}$	5M	May-2017
4	Using $\tan(A+B)$, prove that $\cot(A+B) = \frac{\cot A \cot B - 1}{\cot A + \cot B}$	5M	May-2017
5	P.T $\frac{\cos A + \cos B}{\sin A + \sin B} = \cot\left(\frac{A+B}{2}\right)$	5M	Dec-2016
6	P.T $\frac{\sin 68^\circ + \sin 52^\circ}{\cos 68^\circ + \cos 52^\circ} = \sqrt{3}$	5M	Dec-2015/ Nov-2018
7	Show that $\cos 40^\circ - \cos 50^\circ = \sqrt{2} \sin 5^\circ$	5M	Dec-2015
8	Show that $\sin 47^\circ + \cos 77^\circ = \cos 17^\circ$	5M	Dec-2015
9	Show that $\cos 80^\circ + \cos 40^\circ - \cos 20^\circ = 0$	5M	Dec-2015
10	Show that $\tan^2(315^\circ) \cot(-405^\circ) + \cot(495^\circ) \tan(-585^\circ) = 2$	5M	May-2017
11	Prove that $\cos 55^\circ + \cos 65^\circ + \cos 175^\circ = 0$	5M	May-2017
12	Prove that $\frac{\sin(180^\circ - A) \cos(360^\circ - A) \tan(180^\circ + A)}{\cos(270^\circ + A) \sin(90^\circ + A) \cot(270^\circ - A)} = 1$	5M	Dec-2016/ Nov-2018
13	If $\sec x = 13/5$ and $270^\circ < x < 360^\circ$, Find the value of $\frac{3 \sin x - 2 \cos x}{9 \cos x + 4 \sin x}$	5M	Dec-2016
14	Find the value of $\sin 780^\circ \sin 480^\circ - \cos 120^\circ \sin 330^\circ$	5M	Dec-2016/ Nov-2018
15	Evaluate $\frac{\sin(-\alpha)}{\sin(90^\circ + \alpha)} - \frac{\cos(-\alpha)}{\cos(90^\circ - \alpha)} - \frac{\sec(90^\circ - \alpha)}{\cos(180^\circ + \alpha)}$	5M	Dec-2015
16	Show that $\tan 225^\circ \cot 405^\circ + \tan 765^\circ \cot 675^\circ + \operatorname{cosec} 135^\circ \sec 315^\circ = 0$	5M	Dec-2015
17	Prove that $\cos(A-B) \cos(A+B) = \cos^2 A - \sin^2 B$	5M	Dec-2015
18	Show that $\sin\left(A + \frac{\pi}{4}\right) + \cos\left(A + \frac{\pi}{4}\right) = \sqrt{2} \cos A$	5M	Dec-2015
19	If $\sin A = \frac{5}{13}$, $\sin B = \frac{3}{5}$ find the value of $\sin(A+B)$	5M	Dec-2016/ Nov-2018
20	Prove that $\tan 3\theta - \tan 2\theta - \tan \theta = \tan \theta \tan 2\theta \tan 3\theta$	5M	Dec-2016
21	P.T $\frac{\sin \theta + \sin 3\theta + \sin 5\theta}{\cos \theta + \cos 3\theta + \cos 5\theta} = \tan 3\theta$	5M	May-2017
22	In and triangle ABC prove that $\tan A + \tan B + \tan C = \tan A \tan B \tan C$	5M	May-2017/ Nov-2018
23	Show that $\frac{\sin 9^\circ + \cos 9^\circ}{\cos 9^\circ - \sin 9^\circ} = \tan 54^\circ$	5M	May-2017
24	Prove that $\cos 55^\circ + \cos 65^\circ + \cos 175^\circ = 0$	5M	May-2017
25	Prove that $\sin 20^\circ \times \sin 40^\circ \times \sin 80^\circ = \frac{\sqrt{3}}{8}$	5M	May-2017/ Nov-2018

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26	If $A+B+C=\pi$, prove that $\tan^2 A + \tan^2 B + \tan^2 C = \tan^2 A \cdot \tan^2 B \cdot \tan^2 C$.	5M	Dec 2015
27	In a triangle ABC, prove that $\sin A + \sin B + \sin C = 4 \cdot \cos A/2 \cdot \cos B/2 \cdot \cos C/2$	5M	Dec 2015
28	Prove that $\cos 40^\circ + \cos 80^\circ + \cos 160^\circ = 0$	5M	Dec 2016
29	Evaluate $\cos 570^\circ \cdot \sin 150^\circ \cdot \sin 330^\circ \cdot \cos 390^\circ$	5M	Dec 2016
30	If $\sec \theta = 17/8$ and $270^\circ < \theta < 360^\circ$, find the value of $\frac{15 \operatorname{cosec} \theta - 8 \tan \theta}{17 \cos \theta + 15 \operatorname{cosec} \theta}$	5M	Dec-2016/Dec-2017
31	If $\tan A = 1/2$, $\tan(A+B) = 7/9$, find $\tan B$	5M	Dec 2016
32	Prove that $\frac{\sin 3A}{\sin A} - \frac{\cos 3A}{\cos A} = 2$	5M	Dec-2015
33	Show that $\frac{\sin \theta}{1 + \cos \theta} + \frac{1 + \cos \theta}{\sin \theta} = 2 \operatorname{cosec} \theta$	5M	Dec-2015
34	Show that $\sin 420^\circ \cos 390^\circ + \cos(-300^\circ) \sin(-330^\circ) = 1$	5M	Dec-2015
35	Show that $\sin 3\sin \theta = 3\sin \theta - 4\sin^3 \theta$.	5M	Dec-2017
36	If $\sin A = \frac{1}{\sqrt{10}}$, $\sin B = \frac{1}{\sqrt{5}}$, find the value of $\sin(A+B)$	5M	May-2019
37	Prove that $\cos 3A = 4 \cos^3 A - 3 \cos A$	5M	May-2019
38	Prove that $\sin 10^\circ \cdot \sin 50^\circ \cdot \sin 70^\circ = 1/8$	5M	May-2019
1	If $\tan \theta = 4/3$ and θ is acute angle, find value of $\frac{2\sin \theta - 3\cos \theta}{3\sin \theta + \cos \theta}$.	6M	May- 2018
2	Prove that $\sin 20^\circ \cdot \sin 40^\circ \cdot \sin 80^\circ = \sqrt{3} / 8$.	6M	May-2017
3	Prove that $\cos 80^\circ \cos 60^\circ \cos 40^\circ \cos 20^\circ = \frac{1}{16}$	6M	Dec-2016
4	Evaluate $\tan 315^\circ \operatorname{xcot} 405^\circ + \tan 765^\circ \operatorname{xcot} 675^\circ + \operatorname{cosec} 135^\circ \operatorname{xsec} 315^\circ$	6M	Dec-2016
5	Find x if $\frac{x \sin^2 300^\circ \sec^2 240^\circ}{\cos 225^\circ \operatorname{cosec}^2 240^\circ} = \cot^2 315^\circ \tan^2 300^\circ$	6M	Dec-2016
6	If $\sin \theta = \frac{-1}{4}$ and $\pi < \theta < \frac{3\pi}{2}$, find the value of $\frac{\cos \theta + \tan \theta}{\cot \theta + \sec \theta}$	6M	Dec-2016
7	Evaluate $\frac{\sin(2\pi - A)}{\sin(\pi - A)} - \frac{\tan\left(\frac{\pi}{2} + A\right)}{\cot(2\pi + A)} + \frac{\operatorname{cosec}(-A)}{\sec\left(\frac{\pi}{2} + A\right)}$	6M	Dec-2016
8	In any triangle ABC prove that $\sin A + \sin B + \sin C = 4 \cos(A/2) \cos(B/2) \cos(C/2)$	6M	Dec-2015
9	Show that $\frac{\cos x + \cos 2x - \cos 3x - \cos 4x}{\sin x + \sin 2x + \sin 3x + \sin 4x} = \tan x$	6M	Dec-2015
10	If $A+B+C = 180^\circ$ prove that $\cos^2 A + \cos^2 B + \cos^2 C = 1 - 2 \cos A \cos B \cos C$	6M	Dec-2015
11	Prove that $\cos(A+B) = \cos A \cdot \cos B - \sin A \cdot \sin B$ geometrically	6M	Dec 2015
12	Prove that $\sin(A+B) = \sin A \cdot \cos B + \cos A \cdot \sin B$ geometrically	6M	Dec 2016

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13	Simplify $\frac{\cos(\frac{\pi}{2} + \theta) \sec(-\theta) \tan(\pi - \theta)}{\sec(2\pi - \theta) \sin(\pi + \theta) \cot(\frac{\pi}{2} + \theta)}$	6M	Dec-2016
14	Prove that $\frac{\sin A + \sin 3A + \sin 5A + \sin 7A}{\cos A + \cos 3A + \cos 5A + \cos 7A} = \tan 4A$	6M	Dec-2016
15	If A, B & C are the angles of a triangle, then prove that $\sin 2A + \sin 2B + \sin 2C = 4 \sin A \sin B \sin C$	6M	May-2019
Unit-5[Complex number]			
1.	Find the real and imaginary part of $2-3i$.	3M	May- 2018
2.	Express the product $(1 + i)(1 + 2i)$ in $a + ib$ form	3M	May-2017
3.	Find the real part and imaginary part of $\frac{1}{3+2i}$.	3M	May-2017/ Nov-2018
4.	Evaluate i^{-999}	3M	Dec-2016
5.	Find the complex conjugate of $(1 + 2i)(3i - 4)$	3M	Dec-2016
6.	Express $(3 + 4i)^{-1}$ in the form $a+ib$	3M	Dec-2015
7.	Find the real part and imaginary part of $\frac{1}{\sqrt{2}-i}$	3M	Dec-2016
8.	If $x + iy = \cos \theta + i \sin \theta$ show that $x + \frac{1}{x} = 2 \cos \theta$	3M	Dec-2016
9	Evaluate $i^{98} + i^{72}$	3M	Dec-2017
10	Find the real and imaginary parts of $(2+i)^2$	3M	May-2019
1	Find the modulus and argument of the complex number $= 1 + \sqrt{3}i$.	6M	May-2018/Nov-2019
2	Find the modulus and argument of the complex number $z = -\sqrt{3} + i$ and hence represent in argand diagram	6M	May-2017
3	Find the modulus and amplitude of $(1 - i\sqrt{3})$	6M	Dec-2016
4	Express the complex number $1 + i$ in the polar form.	6M	Dec-2015
5	Find the amplitude of $\sqrt{3} + i$ and represent in Argand diagram	6M	Dec-2015
6	Express the complex number $2+2\sqrt{3}i$ in the polar form.	6M	May-2019
		6M	
Unit-6[Limits]			
1.	Evaluate $\lim_{x \rightarrow 3} \frac{x^3 - 27}{x - 3}$.	3M	May- 2018/ Nov-2018
2.	Evaluate $\lim_{\theta \rightarrow 0} \frac{\sin 4\theta}{\tan 5\theta}$.	3M	May- 2018/ Nov-2018
3	Evaluate $\lim_{x \rightarrow 0} \frac{x^4 - 16}{x - 2}$	3M	Dec 2015
4	Evaluate $\lim_{x \rightarrow 0} \frac{1 - \cos 2x}{x^2}$	3M	May 2015 /Dec 2017
5	Evaluate $\lim_{\theta \rightarrow 0} \left[\frac{\theta}{\tan 5\theta} \right]$	3M	Dec 2016
6	Evaluate $\lim_{x \rightarrow (-2)} \frac{x^3 - 8}{x + 2}$	3M	Dec 2016
7	Evaluate $\lim_{x \rightarrow \infty} \frac{5x^2 + 3x}{7x^2 + 2x}$	3M	Dec-2017
8	Evaluate $\lim_{\theta \rightarrow 2} \frac{\tan 2\theta}{\theta}$	3M	May-2019

ENGG MATHS-I [15SC01M]

1	Evaluate $\lim_{x \rightarrow 2} \frac{x^2 - 9x + 14}{x^2 - 4}$	5M	May- 2018
2	Evaluate $\lim_{x \rightarrow 0} \frac{\sin 4x - \sin 2x}{\sin 6x + \sin 2x}$	5M	May 2017
3	Evaluate $\lim_{x \rightarrow -3} \frac{3x + \tan 2x}{\sin 3x - 5x^2}$	5M	Dec 2015/May-2019
4	Evaluate $\lim_{x \rightarrow 0} \frac{\sqrt{1+x} - \sqrt{1-x}}{x}$	5M	Dec 2016
5	Evaluate $\lim_{x \rightarrow 1} \frac{x^2 + 5x - 14}{x^2 + x - 6}$	5M	Dec-2017/ Nov-2018
1	Prove that $\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1$ where θ is in radian.	6M	May- 2018/Dec-2017
2	Evaluate $\lim_{x \rightarrow -3} \frac{x^2 + 4x + 3}{x^2 + 5x + 6}$	6M	May 2017
3	Evaluate $\lim_{x \rightarrow 1} \frac{x^2 + 5x - 6}{x^2 - 3x + 2}$	6M	Dec 2017
4	Evaluate $\lim_{x \rightarrow 0} \frac{\sqrt{2+x} - \sqrt{2-x}}{x}$	6M	Dec 2015 /Nov-2018
5	Evaluate $\lim_{n \rightarrow \infty} \frac{(5-n^2)(n-2)}{(2n-3)(n+3)(5-n)}$	6M	Dec 2016
6	Evaluate $\lim_{x \rightarrow 0} \frac{\sqrt{1+3x} - \sqrt{1-3x}}{x}$	6M	May-2019

