COURSE: ENGINEERING MATHEMATICS-I   CODE: 25SC11T

MODEL QUESTION PAPER-1

Instructions:

1. The question paper has five parts namely A, B, C and D. Answer all the parts.
2. Part A has 15 Multiple Choice Questions, and 5 Fill in the blanks of 1 mark each
3. Part A should be answered continuously at one or two pages of Answer sheets and only first answer is considered for the marks in subsection I and II of Part A.

PART- A

I)   Choose the appropriate answer for the following questions each question carries one mark.   ***15×1=15***

1. The order of the square matrix is			
a. 2X2	b. 3X3	c. 4X4	d. All
2. The matrix $2\begin{bmatrix} 4 & -1 \\ 3 & 5 \end{bmatrix}$ is			
a. $\begin{bmatrix} 4 & 2 \\ 6 & 10 \end{bmatrix}$	b. $\begin{bmatrix} 8 & -2 \\ 6 & 10 \end{bmatrix}$	c. $\begin{bmatrix} 8 & 2 \\ 6 & 10 \end{bmatrix}$	d. $\begin{bmatrix} 4 & -2 \\ 6 & 10 \end{bmatrix}$
3. The value of the 'x' if $\begin{vmatrix} 2 & 3 \\ 4 & x \end{vmatrix} = 0$			
a. 6	b. 4	c. 3	d. 1
4. The magnitude of the vector $\vec{a} = 4i + 2j + k$ is			
a. $\sqrt{21}$	b. $\sqrt{20}$	c. $\sqrt{27}$	d. $\sqrt{22}$
5. The unit vector along the given vector is determined by			
a. $\frac{\vec{a}}{|\vec{a}|}$	b. $\frac{\vec{a}}{|2\vec{a}|}$	c. $\frac{-\vec{a}}{|\vec{a}|}$	d. $\vec{a} \times |\vec{a}|$
6. The dot product of two vectors is zero when two vectors are			
a. Equal vectors	b. Unit vectors	c. Parallel vectors	d. Perpendicular vectors
7. The radian measure of the angle 30^0 is			
a. $\frac{\pi}{4}$	b. $\frac{\pi}{8}$	c. $\frac{\pi}{5}$	d. $\frac{\pi}{6}$
8. The degree measure of the angle $\left(\frac{\pi}{4}\right)^C$			
a. 30^0	b. 120^0	c. 45^0	d. 60^0
9. sin2A=			
a. sin2Acos2A	b. 2sinA	c. 2cosA	d. 2sinAcosA
10. The modulus of the complex number z=4+3i is			
a. 4	b. 3	c. 5	d. 6
11. The complex conjugate of the complex number z=5-2i is			

a. $5+i$	b. $5i-2$	c. $5+2i$	d. $2i-5$
12. The exponential form of complex number z=1+√3i is			
a. $2e^{\frac{i\pi}{4}}$	b. $3e^{\frac{i\pi}{4}}$	c. $2e^{\frac{i\pi}{6}}$	d. $2e^{\frac{i\pi}{6}}$
13. The value of the $\lim\limits_{x\to2}\frac{x^3-2^3}{x-2}$ is			
a. 2	b. 3	c. 5	d. 6
14. The value of the $\lim\limits_{x\to\theta}\frac{sin4\theta}{\theta}$ is			
a. 1	b. 3	c. 4	d. 2
15. The value of the $\lim\limits_{x\to\theta}\frac{e^{\theta}-1}{\theta}$ is			
a. 1	b. 2	c. 0	d. 3

II) Fill in the blanks with suitable answer provided in the brackets.   ***5×1=5***

$(2, -2, 30, \sqrt{2}, 5)$

1. The value of the determinant of the matrix $\begin{bmatrix} 4 & 5 \\ 2 & 3 \end{bmatrix}$ is _____

2. The dot product of the vectors $\vec{a} = i + 2j + k$ and $\vec{a} = 4i - 2j - 2k$

3. The argument of the complex number z= $\sqrt{3} + i$ is _____

4. The value of $cosec(45^0)$ is _____

5. The limiting value of $\lim\limits_{x\to2}\frac{x^2+x-6}{x-2}$ is _____

PART-B

III. Answer any FIVE questions, each question carries 2 marks.   ***5×2=10***

1. If $A = \begin{bmatrix} 4 & 5 \\ 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 6 \\ 1 & 3 \end{bmatrix}$, find the matrix $3A + 2B$.

2. If $A = \begin{bmatrix} 3 & 2 \\ 2 & 0 \end{bmatrix}$ then find $A + A^T$ matrix.

3. If $\overrightarrow{OA} = 2i - 3j$ and $\overrightarrow{OB} = 8i + 5j$ then find $\overrightarrow{AB}$.

4. If $\vec{a} = i + 2j - k, \vec{b} = 3i - 5j + 2k$ find the magnitude of $3\vec{a} - 2\vec{b}$.

5. Find the value of $sin\,3\,00^0$

6. Find the value of $sin\,1\,5^0$

7. Find the modulus and amplitude of $1 - i$.

8. Evaluate $\lim\limits_{\theta\to0}\left[\frac{\theta}{tan\,5\theta}\right]$

PART-C

1. If $A = \begin{bmatrix} 4 & 3 \\ 2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -3 & 2 \\ 4 & 1 \end{bmatrix}$ find AB matrix.
2. If $\vec{a} = i + 2j + k$ and $\vec{b} = 2i + 4j - k$ then find $|2\vec{b} - 3\vec{a}|$
3. Prove that $\tan(45^0 + A) = \frac{1+\tan A}{1-\tan A}$
4. Prove that $\sin 2A = 2\sin A \cos A$
5. Express $(1 + 2i)(3 + i)$ in $a + ib$ form
6. Find the modulus and amplitude of $1 + \sqrt{3}i$
7. Evaluate $\lim_{\theta \to 0} \left[\frac{\theta}{\tan 5\theta}\right]$
8. Evaluate $\lim_{x \to 2} \frac{x^2 - 9x + 14}{x^2 - 4}$

PART-D (SECTION I)

1. Find A^2 if $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$
2. Find A^{-1} if $A = \begin{bmatrix} 5 & 5 \\ 1 & 2 \end{bmatrix}$
3. If $A = (3, -4, 2)$, $B = (-6, 8, 4)$ then find the position vectors of A and B. Also find $\overrightarrow{AB}$ and $|\overrightarrow{AB}|$.
4. If the vectors $\lambda i + 5j - 6k$ and $7i + 2j + 4k$ are orthogonal find λ.
5. A tower casts a shadow 20 meters long when the angle of elevation of the sun is 60^0. Find the height of the tower.
6. Find the value of $\sin 120^0 \cos 330^0 - \sin 240^0 \cos 390^0$
7. Express $\frac{(2-i)}{(1-i)(3+i)}$ in $a + ib$ form
8. Evaluate $\lim_{x \to 0} \left(\frac{\sqrt{1+x} - \sqrt{1-x}}{x}\right)$

PART-D (SECTION II)

1. Find characteristic equation and characteristic roots of the matrix $A = \begin{bmatrix} 1 & 2 \\ 4 & 3 \end{bmatrix}$.

2. A particle is acted by constant forces $3i - j + 2k$, $-i + 3j + k$, $i + j - 2k$ and is displaced from the point $(-1, 2, 3)$ to $(2, -1, 5)$. Calculate the total work done by the forces.

3. Prove that $sin3A = 3sinA - 4sin^3A$

4. Draw the argand diagram for the complex number $\frac{1+i}{1-i}$

5. Evaluate $\lim\limits_{x \to 2} \left[\frac{x^2-4}{\sqrt{x+2}-\sqrt{3x+2}}\right]$.

COURSE: ENGINEERING MATHEMATICS-1   CODE: 25SC11T

MODEL QUESTION PAPER-2

Instructions:

    1. The question paper has five parts namely A, B, C and D. Answer all the parts.
    2. Part A has 15 Multiple Choice Questions, and 5 Fill in the blanks of 1 mark each.
    3. Part A should be answered continuously at one or two pages of Answer sheets and
       only first answer is considered for the marks in subsection I and II of Part A.

PART- A

I)   ***Choose the appropriate answer for the following questions each question carries one mark.***   ***15×1=15***

1. If A is a matrix of order mXn the its transpose A^T is a matrix of order ___
   a. mXm b. nXm c. $m\,n$ d. nXn

2. Let A be a square matrix, I be the identity matrix and λ *be the any constant*, then the characteristic equation of A is
   a. $A + I = 0$ b. $|A - \lambda\,I| = 0$ c. $|A + \lambda\,I| = 0$ d. $|A - \lambda\,I| = 1$

3. If A be the square matrix and I be the identity matrix then $A.\,adj(A) =$
   a. $A.\,I$ b. $|A|.\,I$ c. I d. 0

4. Unit vector is a vector whose magnitude is
   a. 1   b. 0   c. i   d. *None of these*

5. If two vectors $\vec{a}$ and $\vec{b}$ are orthogonal then
   a. $\vec{a} + \vec{b} = 0$ b. $\vec{a}.\vec{b} = 1$ c. $\vec{a} X \vec{b} = 0$ d. $\vec{a}.\vec{b} = 0$

6. If $\vec{F}$ be the force and $\vec{S}$ be the displacement vector then work done is
   a. $\vec{F} X \vec{S}$ b. $\vec{F}.\vec{S}$ c. $\vec{F} + \vec{S}$ d. *None of these*

7. The value of $210^0 =$ _____ in radians
   a. 3.66   b. 180   c. 2.66   d. 0.66

8. The value of $\tan (600^0) =$ _____
   a. $\sqrt{3}$ b. $\frac{1}{\sqrt{3}}$ c. $-\sqrt{3}$ d. 3

9. cos(A+B)= _____
   a. cosA cosB + sinA sinB   b. cosA cosB . sinA sinB

c. cosA cosB - sinA sinB   d. cosA sinB - sinA cosB

10. The value of $i^{10} = $ _____
    a. -1   b. 0   c. 1   d. 10

11. The conjugate of complex number $-x + iy$ is
    a. $x - iy$ b. $-x - iy$ c. $x + iy$ d. $-x - y$

12. If $z_1 = 1 + i$ and $z_2 = 1 - i$ then $z_1 . z_1 = $ ____
    a. 2   b. -2   c. 0   d. 1

13. The value of $\lim\limits_{x \to 0} \left(\frac{sin2x}{x} \right)$ is
    a. $\frac{1}{2}$ b. 2   c. 0   d. 1

14. The value of $\lim\limits_{x \to 2} \left(\frac{x-2}{x+1} \right)$ is
    b. 0   b. $\frac{1}{3}$ c. 3   d. 1

15. The value of $\lim\limits_{\theta \to 0} \left(\frac{\theta}{tan\theta} \right)$ is
    a. θ b. 1   c. 0   d. 2

II) Fill in the blanks by choosing appropriate answer given in the bracket: *5×1=5*

$(4i - j , -1$,Non-singular, $17, cos\theta)$

1. Inverse of a square matrix exists only for _____ matrix.
2. Addition of two vectors $3i + j - 2k$ and $i - 2j + 2k$ is _____
3.   The value of $sin(90^0 - \theta) = $ _____
4. The modulus of the complex number z= $15 - 8i$ is _____
5. The limiting value of $\lim\limits_{x \to 1} (5x - 6)$ is _____

PART-B

III. Answer any FIVE questions, each question carries 2 marks.   *5×2=10*

1. If $A = \begin{bmatrix} 1 & 3 \\ 4 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 10 & 11 \\ 0 & 2 \end{bmatrix}$, then find the matrix A^T and B^T.

2. If $A = \begin{bmatrix} 4 & 3 \\ 0 & 1 \end{bmatrix}$ then find the matrix A^2.

3. If $\vec{a} = 3i - 5j + 2k$ then find $|\vec{a}|$.

4.   If $\vec{a} = i - j + 3k$ and $\vec{b} = 2i + j - k$ find the magnitude of $\vec{a} + \vec{b}$.

5. Evaluate $cos120^0$

6. Convert $\frac{11\pi}{5}$ into degrees.

7. Find the value of $i^4 - i^{10}$.

8. Evaluate $\lim\limits_{\theta \to 0} \left(\frac{sin3\theta}{\theta} \right)$

PART-C

IV. Answer any FIVE questions each question carries 3 marks   *5×3=15*

1. If $A = \begin{bmatrix} 4 & 1 \\ 5 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -1 \\ 0 & 4 \end{bmatrix}$ find the matrix $3A + 2B$.

2. If $\vec{a} = i - 2j$ and $\vec{b} = 3i + j$ then find $\left| 2\vec{a} + 3\vec{b} \right|$.

3. Using the formula $sin(A + B)$ find the value of $sin(75^0)$.

4. Prove that $cos2A = cos^2A - sin^2A$

5. Express $(1 - i)(3 + 2i)$ in $a + ib$ form

6. Find the amplitude of $\sqrt{3} + i$.

7. Evaluate $\lim\limits_{\theta \to 0} \left[\frac{tan^2 2\theta}{\theta^2} \right]$

8. Evaluate $\lim\limits_{x \to 3} \left(\frac{x-3}{x^2-9} \right)$

PART-D (SECTION I)

V Answer any FIVE, each question carries 5 marks   **5×5=25**

1. If $A = \begin{bmatrix} 4 & 3 \\ 2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -3 & 2 \\ 4 & 1 \end{bmatrix}$ find AB matrix.

2. Solve the equations $4x + 7y = 9$ and $3x + 5y = 6$ by using Cramer's rule.

3. Find the cosine of angle between the vectors $\vec{a} = 3i + j + 4k$ and $\vec{b} = 5i - 10j + 2k$.

4. If the vectors $\lambda i + 5j - 6k$ and $7i + 2j + 4k$ are orthogonal find λ.

5. Find the value of $sin120^0 cos330^0 - sin240^0 cos390^0$

6. Simplify $\frac{sin\,(180^0-A)}{cos(90^0-A)} + \frac{tan\,(180^0+A)}{cot(270^0-A)}$

7. Express the complex number $1 + i$ in polar form.

8. Evaluate $\lim\limits_{x \to 2} \left(\frac{x^2+3x-10}{x-2} \right)$

PART-D (SECTION II)

VI Answer any THREE EACH question carries 10 marks   **3×10=30**

1. Find characteristic equation and characteristic roots of the matrix $A = \begin{bmatrix} 4 & 2 \\ 3 & 5 \end{bmatrix}$.

2. Find the work done by a force $\vec{F} = 4i + 7j - k$ in moving a particle from the point $(3, 5, 9)$ to $(5, 4, 2)$.

3. Prove that $cos3A = 4cos^3A - 3cosA$

4. Express the complex number $1 - i\sqrt{3}$ in exponential form.

5. Evaluate $\lim\limits_{x \to 1} \left[\frac{2x^2-x-1}{x^2+2x-3} \right]$.

MODEL QUESTION PAPER-3

Instructions:

1. The question paper has five parts namely A, B, C and D. Answer all the parts.
2. Part A has 15 Multiple Choice Questions, and 5 Fill in the blanks of 1 mark each.
3. Part A should be answered continuously at one or two pages of Answer sheets and only first answer is considered for the marks in subsection I and II of Part A.

PART- A

I)   ***Select the correct answer from the choices given.***   *15×1=15*

1. The value of x if the matrix $\begin{bmatrix} 4 & x \\ 2 & 1 \end{bmatrix}$ is singular.
   a. 2   b. -2 c. $\frac{1}{2}$ d. $-\frac{1}{2}$

2. The cofactor of 3 in the matrix $\begin{bmatrix} 5 & 3 \\ 2 & 1 \end{bmatrix}$ is
   a. 1   b. -2 c. 2   d. 5

3. The determinant value of the matrix $\begin{bmatrix} 2 & -1 \\ 3 & 5 \end{bmatrix}$ is
   a. -13 b. 7   c. -7 d. 13

4. The magnitude of the vector $\vec{a} = 3i + 4j$ is
   a. $\sqrt{7}$ b. 7   c. $\sqrt{5}$ d. 5

5. If the vectors $3i + 2j + 4k$ and $2i + j + \lambda k$ are orthogonal then the value of λ is
   a. 2   b. $\frac{1}{2}$ c. -2 d. $-\frac{1}{2}$

6. If $\vec{a} = i + 2j$, $\vec{b} = 2i - j$ $\vec{a} + \vec{b}$ is
   a. $3i + 3j$ b. $2i - 2j$ c. $3i + j$ d. $3i - j$

7. The conversion of 120^0 in radian measure is
   a. $\frac{3\pi}{4}$ b. $\frac{3\pi}{5}$ c. $\frac{3\pi}{2}$ d. None of these

8. The value of $\sin(330^0)$ is
   a. $\frac{1}{2}$ b. $\frac{\sqrt{3}}{2}$ c. $-\frac{1}{2}$ d. $-\frac{\sqrt{3}}{2}$

9. The value of $\frac{2\tan 15}{1-tan^2 15}$ is

   a. $\sqrt{3}$ b. $\frac{1}{\sqrt{3}}$ c. 1   d. None of these

10. Real part of the complex number $z = 2 - 3i$ is

   a. 2   b. -3 c. 3   d. None of these

11. The conjugate of complex number $z = 2 + 5i$ is

   a. $5 + 2i$ b. $5 - 2i$ c. $2 - 5i$ d. None of these

12. If $z_1 = 2 - i$ and $z_2 = -1 + 2i$ then $z_1 + z_1$ is

   a. $1 + i$ b. $1 - i$ c. $-2 - 2i$ d. $3 + 3i$

13. The value of $\lim_{\theta \to 0} \left(\frac{sin3\theta}{\theta} \right)$ is

   a. $\frac{1}{3}$ b. 2   c. 3   d. None of these

14. The value of $\lim_{x \to 2} \left(\frac{x^3-8}{x-2} \right)$ is

   b. 4   b. 2   c. 8   d. 0

15. $\lim_{x \to 0} \left(\frac{e^x-1}{x} \right) = $ _____

   a. 1   b. 0   c. $-i$ d. e

II) Fill in the blanks with suitable answers provided in brackets: 5×1=5

      [m , 1 , −1 , 0 , 7]

1. Value of the determinant of the matrix $\begin{bmatrix} 3 & 4 \\ -2 & -3 \end{bmatrix}$ is _____.

2. Magnitude of the vector $2i - 6j + 3k$ is _____.

3. The value of $sin^2 15 + cos^2 15$ is _____.

4. The value of $i^2 + i^4$ is _____.

5. $\lim_{x \to 1} \left(\frac{x^m-1}{x-1} \right)$ is_____.

PART-B

III) Answer any FIVE questions, each question carries 2 marks.   5×2=10

1. If $A = \begin{bmatrix} 2 & -1 \\ 0 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$, then find the matrix $A - B$.

2. Find the value of $A + A^T$ if $A = \begin{bmatrix} 3 & 5 \\ -4 & 8 \end{bmatrix}$.

3. Find the unit vector in the direction of $\vec{a}$ if $\vec{a} = 2i - 4j + k$.

4. Show that the vectors $5i + 4j - 2k$ and $2i - 2j + k$ are perpendicular.

5. Prove that $sin2\theta = 2\ sin\theta\ cos\theta$.

6. Evaluate $sin(\pi + \theta) + cos\left(\frac{3\pi}{2} + \theta\right)$.

7. If $z_1 = 2 + 3i$; $z_2 = 1 - 2i$ then find $z_1.z_2$

8. Find the modulus of the complex number $\sqrt{3} + i$

9. Evaluate $\lim\limits_{x\to\infty}\left[\frac{2x^2-3x+4}{3x^2+5x-1}\right]$

10. Evaluate $\lim\limits_{\theta\to 0}\left(\frac{tan3\theta}{\theta}\right)$

PART-C

IV) Answer any FIVE questions each question carries 3 marks   5×3=15

1. If $A = \begin{bmatrix} 3 & 2 \\ 1 & -4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 3 & 2 \end{bmatrix}$ then find the matrix AB.

2. If the vectors $7i + 4j + 5k$ and $\lambda i + j + 2k$ are orthogonal then find λ.

3. Evaluate $sin120^0 + cos150^0$.
4. Convert the angle 150^0 into radians
5. Simplify $i^5 + i^7$
6. Express the complex number $z = \frac{3-i}{2+3i}$ in $a + ib$ form.

7. Evaluate $\lim\limits_{x\to -2}\left[\frac{x^5+32}{x+2}\right]$
8. Evaluate $\lim\limits_{x\to 1}\left(\frac{x^2-3x+2}{x-1}\right)$

PART-D (SECTION I)

V) Answer any FIVE, each question carries 5 marks   5×5=25

1. Find the inverse of the matrix $A = \begin{bmatrix} 5 & 2 \\ 3 & 4 \end{bmatrix}$.

2. Verify that $(A + B)^T = A^T + B^T$ if $A = \begin{bmatrix} 4 & 2 \\ 3 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 3 \\ -4 & 4 \end{bmatrix}$.

3. Find the projection of the vector $3i + 4j - 2k$ on $i + j + 2k$.

4. Find the cosine of the angle between the vectors $\vec{a} = 2i + 3j - k$ and $\vec{b} = i + 2j + 2k$.

5. Write the formula of $cos(A + B)$ and hence find the value of $cos(75^0)$.

6. A tower is $20\ m$ high. If the angle of elevation from a point on the ground to the top of tower is 45^0 then find the distance of point to the base of the tower.

7. Find the real and imaginary parts of the complex number $z = (3 + 2i)(1 - i)$.

8. Evaluate $\lim\limits_{\theta\to 0}\left(\frac{sin2\theta}{tan3\theta}\right)$

PART-D (SECTION II)

VI) Answer any THREE, each question carries 10 marks   *3×10=30*

1. Find characteristic equation and characteristic roots of the matrix $A = \begin{bmatrix} 2 & 4 \\ 3 & 3 \end{bmatrix}$.

2. If a particle is acted by the force $\vec{F} = 2i - j + 3k$ is displaced from $(1, -1, 3)$ to $(2,\ 3,\ 1)$ then find the work done.

3. Prove that $sin3A = 3sinA - 4sin^3A$

4. Draw the argand diagram for the complex number $z = 1 + \sqrt{3}i$.

5. Evaluate $\lim\limits_{x \to 3} \left[\dfrac{x^2 - 5x - 6}{x^2 + x - 12}\right]$.

Course: Engineering Mathematics-II   Code: 25SC21I

MODEL QUESTION PAPER-3

Instructions:

1. The question paper has five parts namely A, B, C and D. Answer all the parts.
2. Part A has 15 Multiple Choice Questions, and 5 Fill in the blanks of 1 mark each
3. Part A should be answered continuously at one or two pages of Answer sheets and
   only first answer is considered for the marks in subsection I and II of Part A.

PART- A

I)   *Choose the appropriate answer for the following questions each question*
         carries one mark.   ***15×1=15***

1. The slope of the straight line is:			
a. $\tan\theta$	b. $\sin\theta$	c. $\sec\theta$	d. $\cos\theta$
2. The line 3x - 4y + 12 = 0 passes through the point			
a. $(0,0)$	b. $(0,3)$	c. $(3,0)$	d. $(3,3)$
3. If the product of the slopes of two lines is one, then the lines are:			
a. parallel	b. perpendicular	c. neither parallel nor perpendicular	d. both a and b
4. Which rule is used to differentiate $y = e^{sinx}$			
a. *product rule*	b. *quotient rule*	c. *sum rule*	d. *chain rule*
5. If $y = e^{3x} + sinx$ then $\frac{dy}{dx}$ is			
a. $3e^{3x} + cosx$	b. $2e^{3x} - cosx$	c. $e^{3x} + sinx$	d. $3e^{3x} - sinx$
6. The derivative of $sin(x^2)$ is			
a. $-2x\cos(x^2)$	b. $2x\,sin(x^2)$	c. $2x\cos(x^2)$	d. $-2x\,sin(x^2)$
7. The slope of the normal to the given curve $y = f(x)\ is$			
a. $1/\frac{dy}{dx}$	b. $1/\frac{d^2y}{dx^2}$	c. $1/\frac{d^3y}{dx^3}$	$-1/\frac{dy}{dx}$
8. The velocity of the particle with the motion $y = x$ remains			
a. 0	b. 1	c. e^x	d. e^{2x}
9. The acceleration of the particle with the motion $y = f(x)$ remains zero when			
a. Velocity= constant	b. Velocity= 0	c. Velocity= ∞	d. All
10. The integral value of $\int c\,dx$, where c is a constant is			
a. cx	b. $c\frac{x^3}{3}$	c. $c\frac{x^4}{4}$	d. $c\frac{x^2}{2}$
11. The integral value of $\int 2\,sin\,x\,dx$ is			

a. $-2sinx$	b. $sinx$	c. $-2cosx$	d. $cosx$
12. The integral value of $\int 2^x \, dx$ is			
a. $\dfrac{2^x}{3\log 2}$	b. $\dfrac{2^x}{2\log 2}$	c. $\dfrac{2^x}{\log 3}$	d. $\dfrac{2^x}{\log 2}$
13. The integral value of $\int \sec^2 x \, dx$ is			
a. secx	b. tanx	c. secx	d. cosecx
14. The area under the curve $y = f(x)$ is evaluated by			
a. $\int_a^b y \, dx$	b. $\int_a^b y^2 \, dx$	c. $\int_a^b y^3 \, dx$	d. $\int_a^b \sqrt{y} \, dx$
15. The volume generated by rotating the curve $y = f(x)$ about an axis is evaluated by			
a. $\pi \int_a^b y \, dx$	b. $\pi \int_a^b y^2 \, dx$	c. $\pi \int_a^b y^3 \, dx$	d. $\pi \int_a^b \sqrt{y} \, dx$

II) Fill in the blanks with suitable answer provided in the brackets. **5×1=1**

$(3, 0, ax + by + c = 0, 5, indefinite\ integral)$

1. The equation of line in general form is _____

2. The derivative of a y=5x function is _____

3. The slope of the normal at (2, 3) point on the curve $y = 3x$ is 2 then slope of the tangent at the same point is _____

4. The integral value of $\int_1^1 x \, dx$ is _____

5. The constant of integration is not added in the evaluation of _____

PART-B

III. Answer any FIVE questions, each question carries 2 marks. **5×2=10**

1. Find the equation of line with y-intercept 2 units and slope 5.

2. Find the slope of straight line passing through (4, 5) and (2, 2)

3. If $y = x^4 - sinx$ then find $\dfrac{dy}{dx}$.

4. If $y = e^x \, logx$ then find $\dfrac{dy}{dx}$.

5. Find the slope to the tangent to the curve $y = x^4 + 2x$ at (1,3).

6. Find the velocity equation for the displacement $y = 2x^3$.

7. Integrate $\dfrac{1}{x^3} + \dfrac{1}{x^2}$ w.r.t. x

8. Integrate $e^{3x} + 2x^2$ w.r.t. x

9. Integrate $cos2x + 3^x$ w.r.t. x

10. Evaluate $\int_0^1 x/2 \, dx$

11. Evaluate $\int_1^2 1/x \, dx$

PART-C

1. Find the equation of line joining the points $(1, -2)$ and $(2,5)$.
2. Find the equation of line with slope 5 units and y- intercept 3 units.
3. If $y = \sin(x^2)$ then find $\frac{dy}{dx}$

4. If $y = \frac{tanx}{1+x}$ then find $\frac{dy}{dx}$
5. Find slope of tangent to the curve $y = sinx + 2$ at x=0
6. If the law of motion of a particle is s $= 3t^2 + 2t + 4$, find its velocity after 3 seconds
7. Evaluate $\int sin^3 x \, dx$
8. Evaluate $\int (x^2 + x + 3)^2 \, (2x + 1) \, dx$.

9. Evaluate the integral $\int x^2 \, logx \, dx$ using integration by parts.
10. Evaluate $\int \frac{1+3x}{x} dx$.
11. Evaluate $\int_0^{\frac{\pi}{4}} cos \, x \, dx$

PART-D (SECTION I)

1. Find *the slope , x intercept and y intercept for the line* $x + 8y - 3 = 0$
2. If $y = 2x^3 + e^x + 6$ then find the second derivative of y w.r.t x.
3. Find equation of tangent to the curve $y = 3x^2 + 5x - 4$ at the point $(1,4)$

4. Integrate $4x^3 + cosx + e^{2x} + 3 + \frac{1}{x}$ w.r. t. x
5. Find the area bounded by the curve $y = 3x^2 + 3$, x-axis and ordinates $x = 2$ and $x = 3$

PART-D (SECTION II)

1. Find the value of k for the lines kx+6y-2=0 and x+3y+1=0 to be parallel. Also find the equation of line passing through (-1, 5) and parallel to the given lines.

2. If y=$2e^{3x} + 4e^{-3x}$ then find $\frac{d^2y}{dx^2} \, at \, x = 0$

3. The displacement of a particle S meters moving along a straight line is s=$2t^3 - t + 4$. Find the velocity and acceleration when a) t=2 secs and b) t= 5 secs respectively.

4. Evaluate the integral a) $\int x \, sinx \, dx$ b) $\int x \, sec^2x \, dx$ using integration by parts.

5. Find the volume of the solid generated by revolving the curve $y^2 = x - 1$ about x – axis and ordinates x=2 and x=4.

Course: Engineering Mathematics-II   Code: 25SC21I

MODEL QUESTION PAPER-1

Instructions:

1. The question paper has five parts namely A, B, C and D. Answer all the parts.
2. Part A has 15 Multiple Choice Questions, and 5 Fill in the blanks of 1 mark each
3. Part A should be answered continuously at one or two pages of Answer sheets and only first answer is considered for the marks in subsection I and II of Part A.

PART- A

I) *Choose the appropriate answer for the following questions each question carries one mark.* **15×1=15**

1. The general form of the equation of a straight line is:			
a. $y = mx + c$	b. $ax^2 + bx + c = 0$	c. $ax + by + c = 0$	b. $y^2 = 4ax$
2. The slope of the line 3x - 4y + 12 = 0 is:			
a. 3	b. -3	c. $\frac{3}{4}$	d. $-\frac{3}{4}$
3. Two lines are said to be perpendicular if the product of their slopes is:			
a. 0	b. ∞	c. 1	d. -1
4. Which rule is used to differentiate $y = e^x x^2$			
a. *product rule*	b. *quotient rule*	c. *sum rule*	d. *difference rule*
5. If $y = x^3 + \log x$ then $\frac{dy}{dx}$ is			
a. $3x^2 + \frac{1}{x^2}$	b. $3x^3 + \frac{1}{x^2}$	c. $3x^2 + \frac{1}{x}$	d. $3x^2 + \frac{1}{x^3}$
6. The derivative of $\sqrt{x}$ is			
a. $\frac{1}{x}$	b. $\frac{1}{\sqrt{x}}$	c. $\frac{1}{2\sqrt{x}}$	d. $\frac{1}{2x}$
7. The slope of the tangent to the given curve $y = f(x)$ *is*			
a. $\frac{dy}{dx}$	b. $\frac{d^2y}{dx^2}$	c. $\frac{d^3y}{dx^3}$	$\frac{d^4y}{dx^4}$
8. The velocity of the particle with the motion $y = e^x$ remains			
a. 0	b. 1	c. e^x	d. e^{2x}
9. The acceleration of the particle with the motion $y = sinx$ remains			
a. sinx	b. -sinx	c. cosx	d. -cosx
10. The integral value of $\int x \, dx$ is			
a. $\frac{x^2}{2}$	b. $\frac{x^3}{3}$	c. $\frac{x^4}{4}$	d. 0
11. The integral value of $\int sin\, x \, dx$ is			
a. $-sinx$	b. $sinx$	c. $-cosx$	d. $cosx$

12. The integral value of $\int \frac{1}{\sqrt{x}} dx$ is			
a. $\sqrt{x}$	b. $3\sqrt{x}$	c. $2\sqrt{x}$	d. x
13. The integral value of $\int secx \ tanx \ dx$ is			
a. secx	b. tanx	c. secx	d. cosecx
14. The area under the curve $y = f(x)$ is evaluated by			
a. $\int_a^b y \, dx$	b. $\int_a^b y^2 \, dx$	c. $\int_a^b y^3 \, dx$	d. $\int_a^b \sqrt{y} \, dx$
15. The volume generated by rotating the curve $y = f(x)$ about an axis is evaluated by			
a. $\pi \int_a^b y \, dx$	b. $\pi \int_a^b y^2 \, dx$	c. $\pi \int_a^b y^3 \, dx$	d. $\pi \int_a^b \sqrt{y} \, dx$

II) Fill in the blanks with suitable answer provided in the brackets.   **5×1=1**

(-1/2 , 0, $\frac{x}{a} + \frac{y}{b} = 1$, 2x , definite integral)

1. The equation of line in intercept form is _____

2. The derivative of a constant function is _____

3. The slope of the tangent at (1, 2) point on the curve $y = 2x$ is 2 then slope of the normal at the same point is _____

4. The integral value of $\int 2 \, dx$ is _____

5. The constant of integration is not added in the evaluation of _____

PART-B

III. Answer any FIVE questions, each question carries 2 marks.   **5×2=10**

1. Find the equation of line passing through the point (3, 4) having slope 5.

2. Find the slope of straight line whose inclination with x – axis is 45^0.

3. If $y = x^3 - log \ x$ then find $\frac{dy}{dx}$.

4. If $y = x \ logx$ then find $\frac{dy}{dx}$.

5. Find the slope to the tangent to the curve $y = x^2 + 1$ at (1,3).
6. Find the velocity equation for the displacement $y = 3x^2$.

7. Integrate $tan2x + 2^x$ w.r.t. x

8. Evaluate $\int_0^2 e^x \, dx$

PART-C

1. Find the equation of line joining the points $(3, 2)$ and $(-1, 5)$.

2. If $y = \frac{1+x^2}{1-x^2}$ then find $\frac{dy}{dx}$.

3. Find slope of normal to the curve $y = x^3 - x$ at the point (2,3).

4. The displacement of a particle in time 't' seconds is given by $s = t^3 - 6t^2$. Find the velocity after t=3 seconds.

5. Evaluate $\int \cos^2 x \, dx$

6. Evaluate $\int \frac{2x+1}{x^2 + x + 1} dx$

7. Evaluate the integral $\int x \, e^x \, dx$ using integration by parts.

8. Evaluate $\int_0^1 (x+2)(x-5) dx$.

PART-D (SECTION I)

1. Find equation of line parallel to $2x + y - 3 = 0$ which passes through the point $(2,3)$.

2. Find *the slope , x intercept and y intercept for the line* $2x + 3y - 6 = 0$.

3. If $y = x^3 + \sin x - \log x - \sqrt{x} + 5$ then find $\frac{dy}{dx}$.

4. If $y = \frac{1 + \sin x}{1 - \sin x}$ then find $\frac{dy}{dx}$.

5. Find equation of tangent to the curve $y = x^2 + x$ at the point (1,2).

6. Integrate $e^x + 2^x - \sin x + x^3 + 3$ w.r.t. x.

7. Evaluate $\int (x^2 + x + 9)^{10} (2x + 1) dx$

8. Find the area bounded by the curve $y = 4x - x^2 - 3$, x-axis and ordinates $x = 1$ and $x = 3$.

PART-D (SECTION II)

VII Answer any THREE questions, each question carries 10 marks **3×10=30**

1. Verify whether the line 2x+3y-6=0 is parallel, perpendicular or either to the given lines $3x + 6y - 10 = 0, 3x + 4y - 7 = 0, 3x - 2y - 9 = 0, 5x + 10y - 7 = 0$ and $8x - 4y = 0$.

2. If $y = A \cos mx + B \sin mx$ then find $\frac{d^2y}{dx^2}$.

3. The displacement of a particle S meters moving along a straight line is $S = 4t^3 - 2t^2 + t$. Find the velocity and acceleration when $t = 2$ secs and t= 3secs respectively.

4. Evaluate the integrals i) $\int x \sin x \, dx$ ii) $\int x^2 \log x \, dx$ using integration by parts.

5. Find the volume of the solid generated by revolving the curve $y^2 = 3x^2 - 2x + 1$ about x – axis and ordinates $x = 0$ and $x = 2$.

Course: Engineering Mathematics-II   Code: 25SC21I

MODEL QUESTION PAPER-2

Instructions:

1. The question paper has five parts namely A, B, C and D. Answer all the parts.
2. Part A has 15 Multiple Choice Questions, and 5 Fill in the blanks of 1 mark each
3. Part A should be answered continuously at one or two pages of Answer sheets and only first answer is considered for the marks in subsection I and II of Part A.

PART- A

I)   *Choose the appropriate answer for the following questions each question carries one mark.*   ***15×1=15***

1. The slope-intercept form of the equation of a straight line is:			
a. $y = mx + c$	b. $ax^2 + bx + c = 0$	c. $ax + by + c = 0$	b. $y^2 = 4ax$
2. The slope of the line parallel to x-axis is:			
a. 1	b. 0	c. ∞	d. -1
3. Two lines are said to be parallel if their slopes are:			
a. 0	b. ∞	c. equal	d. -1
4. Which rule is used to differentiate $y = \dfrac{x^2}{sinx}$			
a. *product rule*	b. *quotient rule*	c. *sum rule*	d. *difference rule*
5. If $y = x^4 + cosx$ then $\dfrac{dy}{dx}$ is			
a. $4x + cosx$	b. $4x^3 - sinx$	c. $4x^3 + sinx$	d. $x^3 - sinx$
6. The derivative of $logx$ is			
a. $\dfrac{1}{x}$	b. $\dfrac{1}{\sqrt{x}}$	c. $\dfrac{1}{2\sqrt{x}}$	d. $\dfrac{1}{2x}$
7. The slope of the normal to the given curve $y = 2x + 1$ at $x = 0$ is			
a. 1	b. 2	c. $\dfrac{1}{2}$	d. $\dfrac{-1}{2}$
8. If S is the displacement at any time 't', then velocity is given by			
a. $\dfrac{dS}{dt}$	b. $\dfrac{S}{t}$	c. $\dfrac{d^2S}{dt^2}$	d. $\dfrac{dt}{dS}$
9. The acceleration of the particle with the motion $y = 3x + 2$ at any time x is			
a. 2	b. 0	c. 3	d. 5
10. The integral value of $\int 2\,dx$ is			
a. 0	b. 2x	c. 2	d. 2+x
11. The integral value of $\int \dfrac{1}{x}dx$ is			

a. $\frac{-1}{x^2}$	b. $\frac{1}{x}$	c. $logx$	d. x
12. The integral of is $\int secx^2 \, dx$			
a. $sinx$	b. $cosx$	c. $-sinx$	d. $tanx$
13. The integral value of $\int sinx \, cosecx \, dx$ is			
a. secx	b. x	c. sinx	d. cosecx
14. $\int_a^b y \, dx$ determines			
a. Area bounded by the curve and x axis	b. Area bounded by the curve and y axis	c. Volume of solid of rotation	d. None of these
15. If $\int_a^b x \, dx = 0$ then			
a. $a = b$	b. $a = 1, b = 0$	c. $a = -b$	d. a=0,b=1

II) Fill in the blanks with suitable answer provided in the brackets.　　　　*5×1=1*

$(\frac{-1}{m}, \frac{dy}{dx},$ ax+by+c=0, x , indefinite integral)

1. The equation of line general form is _____

2. The rate of change of y w.r.t x is _____

3. The slope of the tangent at a point on the curve $y = f(x)$ is m then slope of the normal at the same point is _____

4. The integral value of $\int 1 \, dx$ is _____

5. The constant of integration is added in the evaluation of _____

PART-B

III. Answer any FIVE questions, each question carries 2 marks.　　　　*5×2=10*

1. Find the equation of line passing through the point (1, -3) having slope 2.

2. Find the slope of straight line whose inclination with $x -$ axis is 30^0 .

3. If $y = x^2 + tanx$ then find $\frac{dy}{dx}$.

4. If $y = xe^x$ then find $\frac{dy}{dx}$.

5. Find the slope to the tangent to the curve $y = x^3 + x$ at(0,1).

6. Find the velocity equation for the displacement $y = sinx + 2$

7. Integrate $\frac{1}{\sqrt{x}} + \frac{1}{x}$ w.r.t. x

8. Integrate $cosecx \, cotx + 1$ w.r.t. x

9. Integrate $e^x + x^2$ w.r.t. x

10. Evaluate $\int_0^2 3 \, dx$

11. Evaluate $\int_0^1 \frac{1}{\sqrt{x}} \, dx$

PART-C

IV Answer any FIVE questions each question carries 3 marks   **5×3=15**

1. Find the equation of line joining the points $(4,2)$ and $(3,-1)$.
2. Find the equation of line with x-intercept 7 units and y- intercept 2 units.
3. If $y = \cos(\log x)$ then find $\frac{dy}{dx}$

4. If $y = \frac{1+sinx}{1-sinx}$ then find $\frac{dy}{dx}$
5. Find slope of tangent to the curve $y = x^2 - 4x + 7$ at the point $(2,3)$
6. If the law of motion of a particle is $s = t^2 - 4t - 5$, find its velocity after 1 seconds
7. Evaluate $\int \cos^3 x \, dx$
8. Evaluate $\int \sin^2 x \cos x \, dx$

9. Evaluate the integral $\int x \log x \, dx$ using integration by parts.
10. Evaluate $\int \frac{x^2+x+1}{x} \, dx$.
11. Evaluate $\int_0^{\frac{\pi}{4}} \sec^2 x \, dx$

PART-D (SECTION I)

VI Answer any THREE EACH question carries 5 marks   **3×5=15**

1. Find *the slope , x intercept and y intercept for the line* $4x - 2y + 5 = 0$
2. If $y = x^4 + tanx + sec\,x - \sqrt{x} + 1$ then find $\frac{dy}{dx}$
3. Find equation of tangent to the curve $y = x^2 + 3x - 1$ at the point $(1,3)$

4. Integrate $x^2 + tanx - sin\,x + e^x + 3$ w .r. t. x
5. Find the area bounded by the curve $y = x^2 + 1$, x-axis and ordinates $x = 1$ and $x = 2$

PART-D (SECTION II)

VII Answer any THREE EACH question carries 10 marks   **3×10=30**

1. Find the value of k for the lines kx+3y-2=0 and 2x+5y+1=o to be i) parallel   ii) perpendicular

2. If y=$ae^{mx} + be^{-mx}$ then find $\dfrac{d^2 y}{dx^2} at \ x = 0$

3. The displacement of a particle S meters moving along a straight line is s=$t^3 + 3t - 1$. Find the velocity and acceleration when a) t=1 secs and b) t= 3secs respectively.

4. Evaluate the integral a) $\int x \ cosx \ dx$ b) $\int xe^x \ dx$ using integration by parts.
5. Find the volume of the solid generated by revolving the curve $y^2 = 4x^3 + 1$, about x – axis and ordinates $x = 0$ and x=1.