



SHRI VISHWAKARMA SKILL UNIVERSITY

(A State Skill University, setup by an Act of Legislature in 2016)

187028

Course : B.Voc. Tool and Die Manufacturing
Subject : Applied Mathematics
Subject Code : ZBSC-101
Semester : First
Duration : 3 Hours
Maximum Marks : 70

Instructions to the Students

1. This Question paper consists of two Sections. All sections are compulsory.
2. **Section A** comprises 10 questions of objective type in nature. All questions are compulsory. Each question carries 2 marks.
3. **Section B** comprises 8 essay type questions out of which students need to do any 5. Each question carries 10 marks.
4. Read the questions carefully and write the answers in the answer sheets provided.
5. Do not write anything on the question paper.
6. Wherever necessary, the diagram drawn should be neat and properly labelled.

Roll Number

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SECTION -A (OBJECTIVE TYPE QUESTIONS)

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(10x2=20 Marks)

1. Write the following set in the set builder form $X = \{3, 6, 9, \dots, \infty\}$.
2. If ${}^n C_{10} = {}^n C_{12}$, find n .
3. Express the following angles in radians: (a) 30° (b) 150° .
4. Evaluate: $\left(\sin \frac{\pi}{6} + \sin \frac{\pi}{4}\right) \left(\cos \frac{\pi}{3} - \cos \frac{\pi}{4}\right) + \frac{1}{4}$
5. If the determinant of the matrix $\begin{bmatrix} 1 & 2 \\ 3 & a \end{bmatrix}$ is zero, then a is ..
6. Find the inverse of the matrix $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$.
7. If $y = (x^2 + 1)(x - 1)$, then, find the value of $\frac{dy}{dx}$.
8. Find the value of $\frac{dy}{dx}$, if $y = \sec \sqrt{x}$.
9. Evaluate $\int (4 - 7x)^{10} dx$.
10. Solve $\int_0^{\frac{\pi}{2}} \cos x dx$.

SECTION -B (ESSAY TYPE QUESTIONS)

(5x10=50 Marks)

1. Write the middle term(s) in the expansion of $\left(y^2 - \frac{1}{y}\right)^{11}$.

A committee of 5 persons is to be formed from 6 men and 4 women. In how many ways can this be done when

2. (i) at least 2 women are included?
(ii) at most 2 women are included?

3. Prove that: $\cos \frac{\pi}{9} \cdot \cos \frac{2\pi}{9} \cdot \cos \frac{\pi}{3} \cdot \cos \frac{4\pi}{9} = \frac{1}{16}$.

4. Prove that: $\sin \alpha \cdot \sin \left(\frac{\pi}{3} + \alpha\right) \cdot \sin \left(\frac{\pi}{3} - \alpha\right) = \frac{1}{4} \sin 3\alpha$.

5. Solve the given system of equations, using Cramer's Rule $2x + y - z = 2$; $x + 2y - 3z = -1$; $5x - y - 2z = -1$

6. If $y = \sin(\sin x)$, then prove that $\frac{d^2 y}{dx^2} + \tan x \frac{dy}{dx} + y \cos^2 x = 0$.

7. Find the first derivative of the function $e^{\sin x} \sin e^x$.

8. Evaluate $\int \frac{x+1}{(x-2)(x-3)} dx$.

-----End of Paper-----