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200958

DIPLOMA
Piping Technology
Subject: Applied Mathematics
Subject Code: MTH501
Semester: First
September 2020
Theory (External): 70 Marks
Time: 03 Hours

INSTRUCTIONS TO THE STUDENTS

1. Read the questions carefully and write the answers in the answer sheets.

2. Wherever necessary, the diagram drawn should be neat and properly labelled.

3. This questions paper comprises of 8 questions out of which student need to attempt any 4 questions.

4. All questions carry equal marks.

5. The time allotted will be 3 hours for examinations including time of downloading of question paper to emailing of answer books to the concerned Dean/IC.

ESSAY TYPE QUESTIONS

1 (i) Find the Coefficient of x^5 in the expansion of $(x+3)^8$.

(ii) Find the number of different 8-letter arrangements that can be made from the letters of the word daughter so that
   a) All vowels occur together.
   b) All vowels do not occur together.

2 Prove that $\cos 4x = 1 - 8sin^2x.cos^2x$

3 (i) Find the inverse of the matrix by adjoint method.

$$\begin{bmatrix} 2 & 1 \\ 7 & 4 \end{bmatrix}$$

(ii) Find the determinant of the matrix

$$\begin{bmatrix} 6 & 1 & -3 \\ 1 & 3 & -2 \\ 2 & 1 & 4 \end{bmatrix}$$

4 Solve the system of equations using cramer's rule.

$x + 2y + 3z = 6$
$2x + 4y + z = 7$
$3x + 2y + 9z = 14$

5 Find the value of the integration

(i) $\int \frac{\sin x}{1+\cos x} dx$

(ii) $\int_0^{\frac{\pi}{2}} \sin x \, dx$

6 Find the derivative of following w.r.t x:

(i) $\frac{2x+3}{x^2-5}$

(ii) $\sec(2x+3).\tan(2x+3)$

7 If $f : R \to R$ then draw the graph of the function

(i)$f(x) = logx$

(ii) $f(x) = 5 + 2x$

8 Find $\frac{dy}{dx}$ when $\log xy = x^2 + y^2$

*****END OF PAPER*****