190705

ADVANCE SKILL DIPLOMA
PRESS TOOL & DIE MAINTENANCE & STAMPING

Subject: Applied Mathematics
Subject Code: ZDSC-101
Semester: 1st (Regular)
Batch: 2019-20
Theory (External): 70 Marks
Time: 03 hours

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

SECTION –A (OBJECTIVE TYPE QUESTIONS)

(10x2=20 Marks)

Q1 The number of elements in the power set of the set $\{x : x \text{ is a solution of } x^2 + 5x + 6 = 0\}$ is

a) 8 b) 4

c) 3 d) 7

Q2 The value of r in the expression ${}^5C_r = {}^5C_{r-1}$ is

a) 8 b) 3

c) 5 d) 7

Q3 Using binomial theorem, the value of $(102)^5$ is

a) 11040808032 b) 11040808034

c) 11240808036 d) 11140808038

Q4 The value of $\dfrac{\cos 7x + \cos 5x}{\sin 7x - \sin 5x}$ is

a) $\tan x$ b) $\cot x$

c) $\sec x$ d) None of these

Q5 If $\begin{bmatrix} 4 & 3 \\ x & 5 \end{bmatrix} = \begin{bmatrix} y-x & 3 \\ 6-y & z \end{bmatrix}$ the vales of x, y and z are

a) 1, 5 and 3 b) 1, 5 and 5

c) 1, 7 and 3 d) 1, 3 and 5

Q6 The value of $\begin{vmatrix} 2 & -1 \\ 3 & -4 \end{vmatrix}$ is equal to

a) 5 b) -5

c) 11 d) -11

Q7 The value of $\dfrac{d}{dx}\left(\dfrac{1}{x}\right)$ is

a) x^2 b) $-x^2$

c) $-\dfrac{1}{x^2}$ d) None of these

Q8 $\int \sin 2\theta d\theta = ?$

a) $-\frac{1}{2}\cos 2\theta + c$ b) $\frac{1}{2}\cos 2\theta + c$

c) $\cos 2\theta + c$ d) $-\cos 2\theta + c$

Q9 What is the value of a for which $\begin{bmatrix} 1 & 4 \\ 2 & a \end{bmatrix}$ is a non-singular matrix?

a) 5 b) 6

c) 7 d) None of these

Q10 Which of the following correctly evaluates the definite integral $\int_1^3 (x^2 + 3x + 2)dx$

a) $\frac{110}{3}$ b) $\frac{97}{3}$

c) 4 d) $\frac{74}{3}$

SECTION –B (ESSAY TYPE QUESTIONS)

(5x10=50 Marks)

Q1 i) In a survey of 60 people, it was found that 25 people read newspaper H, 26 read newspaper T, 26 read newspaper I, 9 read both H and I, 11 read both H and T, 8 read both T and I, 3 read all the three newspaper. Find the number of people reading atleast one newspaper. Also find the number of people reading exactly one newspaper.

ii) Find the Coefficient of x^6 in the expansion of $x(x+2)^8$.

Q2 i) Prove that $\tan 3x \tan 2x \tan x = \tan 3x - \tan 2x - \tan x$.

ii) If a tower 20 m. high makes an angle of elevation of 45^0 at a certain point at some distance from the foot. Find the distance of the point.

Q3 Solve the following equations by crammer's rule

$2x+z=1$

$3y-6z=-1$

$-x+z=0$

Q4 If $e^y(x+1)=1$ then show that $\frac{d^2y}{dx^2}=\left(\frac{dy}{dx}\right)^2$.

Q5 Find the value of

(*i*) $\int \log x dx$

(*ii*) $\int_0^1 \frac{dx}{1+x^2}$

Q6 If $f: R \to R$ then draw the graph of the function

i) $f(x)=2-x^2$

ii) $f(x)=1+3x$

Q7 i) Check the following matrix for invertible and if yes then find the inverse:

$$\begin{bmatrix} 1 & 1 \\ 2 & 3 \end{bmatrix}$$

ii) Find the determinant of the matrix: $\begin{bmatrix} 1 & -1 & 4 \\ 5 & 2 & 3 \\ -2 & 3 & 1 \end{bmatrix}$

Q8 i) If $x\sqrt{1+y}+y\sqrt{1+x}=0,\ -1<x<1$, prove that $\frac{dy}{dx}=-\frac{1}{(1+x)^2}$.

ii) Find the derivative of $(5x)^{3\cos 2x}$ w.r.to x.

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