1st UNIT TEST 2017-2018

Sub: Mathematics & Statistics

Std: XII(Sci) **Marks :25**

Date : **Time:**

I (A) Select and write the correct answer from the given alternatives in each of the following **(6)**

i. If $y = 1 - \cos\theta, x = 1 - \sin\theta$, then $\frac{dy}{dx}$ at $\theta = \frac{\pi}{4}$ is

(A) -1 (B) 1

(C) $\frac{1}{2}$ (D) $\frac{1}{\sqrt{2}}$

(ii) The inverse of the matrix $\begin{bmatrix} -1 & 5 \\ -3 & 2 \end{bmatrix}$ is _____.

(A) $\frac{1}{13}\begin{bmatrix} 2 & -5 \\ 3 & -1 \end{bmatrix}$ (B) $\frac{1}{13}\begin{bmatrix} -1 & 5 \\ -3 & 2 \end{bmatrix}$

(C) $\frac{1}{13}\begin{bmatrix} -1 & -3 \\ 5 & 2 \end{bmatrix}$ (D) $\frac{1}{13}\begin{bmatrix} 1 & 5 \\ 3 & -2 \end{bmatrix}$

(iii) If p and q are true statements and r and s are false statements, then the truth value of the compound statement (p s) (p→q) is _____.

(A) T (B) F

(C) T and F (D) T or F

Q 1. (B) Attempt any THREE of the following: **(6)**

i. Examine the continuity of the function

$f(x) = \sin x - \cos x$, for $x \neq 0$

$= -1$, for $x = 0$

at the point $x = 0$.

ii. Find $\frac{dy}{dx}$ if $x = at^2$, $y = 2at$

iii. Write down the statements in symbolic form :

(a) A triangle is equilateral if and only if it is equiangular.

(b) Price increases and demand falls.

iv. If $A = \begin{bmatrix} 2 & -2 \\ 4 & 3 \end{bmatrix}$ then find A^{-1} by adjoint method.

v. Differentiate $(x^x + a^x)$ w.r.t x.

Q 2 (A) Attempt any THREE of the following : **(9)**

i. Construct the switching circuit for the following statement :
[p (~p q)] [(~q r) ~p]

ii. Find the values of a and b such that the function defined by

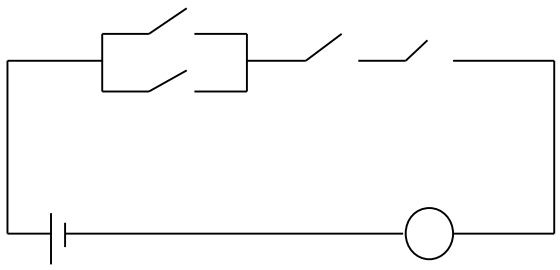
$f(x) = 5$, if $x \quad 2$
$= ax + b$, if $2 < x < 10$
$= 21$, if $x \quad 10$
is continuous at $x = 2$ as well as $x = 10$.

iii. If $x^y = e^{x-y}$, show that $\frac{dy}{dx} = \frac{\log x}{(1 + \log x)^2}$.

iv. Solve the following equations by the method of reduction:
$2x - y + z = 1$; $x + 2y + 3z = 8$; $3x + y - 4z = 1$

Q2(B) **Attempt any ONE of the following :** **(4)**

1. Find the symbolic form of the following switching circuit. Construct its switching table and interpret the result.



2. If $y = (\tan x)^{\sin x} + (\sin x)^{\tan x}$, find $\frac{dy}{dx}$