

ultimate tutorial

Subject: MATHEMATICS

Branch: Head Office

Date: 27-Jan-2020

Marks: 40

SECTION - A

1 Find the co-factors of the elements of the following matrices : 01

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

2 Write the negations of following statements. 01
All students of this collage live in the hostel.

3 Write the negations of following statements. 01
Some continuous functions are differentiable.

4 Write negations of the following statements : 01
It is false that the sky is not blue.

SECTION - B

1 If G_1 and G_2 are the centroids of the triangles ABC and PQR respectively, then prove that $\overline{AP} + \overline{BQ} + \overline{CR} = 3\overline{G_1G_2}$ 02

2 Find k, 02
If one of the lines given by $3x^2 - kxy + 5y^2 = 0$ is perpendicular to the line $5x + 3y = 0$

3 Find the value of k, if the following equations represent a pair of lines : 02
 $3x^2 + 10xy + 3y^2 - 16y + k = 0$

4 If $\vec{u} = \vec{i} - 2\vec{j} + \vec{k}$, $\vec{v} = 3\vec{i} + \vec{k}$ and $\vec{w} = \vec{j} - \vec{k}$ are given vectors. then find. 02
 $\vec{u} = \vec{i} - 2\vec{j} + \vec{k}$, $\vec{v} = 3\vec{i} + \vec{k}$ and $\vec{w} = \vec{j} - \vec{k}$ are given vectors. then find.
 $[\vec{u} \times \vec{v} \quad \vec{u} \times \vec{w} \quad \vec{v} \times \vec{w}]$

5 Without using truth tables, show that 02
 $\sim p \wedge q \equiv (p \vee q) \wedge \sim p$

6 If P orthocenter, Q is circumcenter and G is centroid of a triangle ABC, then prove that $\overline{QP} = 3\overline{QG}$. 02

SECTION - C

1 Find the co-ordinates of the point which trisects the line segment joining the points A(2, 1, 4) and B(-1, 3, 6) 03

2 Using truth tables examine whether the following statement pattern is tautology, contradiction or contingency. 03
 $(p \wedge q) \vee (\sim p \wedge q) \vee (p \wedge \sim q) \vee (\sim p \wedge \sim q)$

3 Show that following equations represent a pair of lines, find the acute angle between each pair :

03

$$9x^2 - 6xy + y^2 + 18x - 6y + 8 = 0$$

SECTION - D

1 Find the inverse of the following method by using transformation method.

04

$$\begin{bmatrix} 2 & 0 & -1 \\ 5 & 1 & 0 \\ 0 & 1 & 3 \end{bmatrix}$$

2 In a city there are two factories A and B. Each factory produces sports clothes for boys and girls. There are three types of clothes produced in both the factories, type I, II and III. For boys the number of units of types I, II and III are 80, 70 and 65 in factory A and 85, 65 and 72 in factory B. For girls the number of units of I, II and III are 80, 75, 90 in factory A and 50, 55, 80 in factory B. Express this information in terms of matrices and using matrix Algebra, answer the following questions. (i) how many total units of type I produced for boys?

04

(ii) what is that total production of each type for boys and girls ?

3 Find the inverse of the following method by using transformation method.

04

$$\begin{bmatrix} 1 & 2 & -2 \\ 0 & -2 & 1 \\ -1 & 3 & 0 \end{bmatrix}$$