

General Maths & Science Previous Questions

Maths

Question 1. If A and B are invertible matrices of order 3, $|A| = 2$ and $| (AB)^{-1} | = -1/6$. Find $|B|$.

Solution:

$$| 1/(AB) | = -1/6 \Rightarrow 1/(|A||B|) = -1/6 \Rightarrow |B| = -3.$$

Question 2. Differentiate $\sin^2(x^2)$ w.r.t x^2 .

Solution:

$$2 \sin(x^2) \cos (x^2) \text{ or } \sin (2x^2)$$

Question 3. Write the order of the differential equation: $\log (d^2y/dx^2) = (dy/dx)^3 + x$.

Solution:

2

Question 4. Find the acute angle which the line with direction cosines $1/\sqrt{3}, 1/\sqrt{6}$, makes with positive direction of z-axis.

Solution:

$$l^2 + m^2 + n^2 = 1 \Rightarrow (1/\sqrt{3})^2 + (1/\sqrt{6})^2 + n^2 = 1 \Rightarrow \cos \gamma = 1/\sqrt{2} \Rightarrow \gamma = 45^\circ \text{ or } \pi/4.$$

OR

Question 4. Find the direction cosines of the line: $(x - 1)/2 = -y = (z + 1)/2$.

Solution:

Direction ratios of the given line are 2, -1, 2.

Hence, direction cosines of the line are:

$$2/3, -1/3, 2/3 \text{ or } -2/3, 1/3, -2/3$$

Section B

Question 5. Let $A = Z \times Z$ and $*$ be a binary operation on A defined by

$$(a,b)*(c,d) = (ad + bc, bd).$$

Find the identity element for $*$ in the set A .

Solution:

An element $(e, f) \in Z \times Z$ be the identity element, if

$$(a, b) * (e, f) = (a, b) = (e, f) * (a, b) \quad \forall (a, b) \in Z \times Z$$

$$\text{i.e., if, } (af + be, bf) = (a, b) = (eb + fa, fb)$$

$$\text{i.e., if, } af + be = a = eb + fa \text{ and } bf = b = fb \dots(1)$$

$$\text{i.e., if, } f = 1, e = 0 \dots(2)$$

Hence, $(0, 1)$ is the identity element.

<https://www.freshersnow.com/number-series-quiz/>

Question 6:

If a die is thrown and a card is selected at random from a deck of 52 playing cards, then find the probability of getting an even number on the die and a spade card.

Solution:

Let E_1 = Event for getting an even number on the die and E_2 = Event that a spade card is selected

$$\therefore P(E_1) = \frac{3}{6} = \frac{1}{2} \text{ and } P(E_2) = \frac{13}{52} = \frac{1}{4}$$

$$\text{Then, } P(E_1 \cap E_2) = P(E_1) \cdot P(E_2) = \frac{1}{2} \cdot \frac{1}{4} = \frac{1}{8}$$

Question 7: Find the number of all possible matrices of order 2×2 with each entry 0, 1 or 2.

Solution:

Elements of a 2×2 matrix = 4

Each of these elements can be either 0, 1 or 2

Each of the 4 elements can be filled in three possible ways.

Therefore, by the multiplication principle,

The required number of possible matrices is $3^4 = 81$

Question 8:

Find the differential equation of all non-vertical lines in a plane.

Solution:

The family of all non-vertical line is represented as:

$$y = mx + c, \text{ where } m \neq \tan \frac{\pi}{2}$$

On differentiating above equation w. r. t. x , we get

$$\frac{dy}{dx} = m \dots\dots(i)$$

Again, differentiating equation (i) w. r. t. x , we get

$$\frac{d^2y}{dx^2} = 0$$

General Science

1. Which vitamin is needed to prevent Xero-phthemia?

A. A

B. B

C. C

D. D

Ans: A

2. Why the white blood corpuscles are popularly called "soldiers of the body"?

A. March at a regular pace

B. Appear uniform

C. Defend the body

D. Disciplined

Ans: C

3. The oxidation state of oxygen in OF_2 is:

A. +2

B. -2

C. +1

D. -1

Ans: A

4. The acid is a substance which:

A. Accepts (gains) electron

B. Donates electrons

C. Provides (donates) proton

D. Donates OH^- ion

Ans: C

5. Which of the following phenomena is related with the large transformers, when used for some time, become very hot and is cooled by circulating oil?

A. The heating effect of current alone

B. Hysteresis loss alone

C. Both the heating effect of current and hysteresis loss

D. Intense sunlight at noon

Ans: C

6. Which of the following name of scientist is expressed as a unit of nuclear size?

A. Fermi

B. angstrom

C. newton

D. tesla

Ans: A

<https://www.freshersnow.com/previous-year-question-papers/>

7. Chromosome complement in Turner's syndrome is

A. 47; XXY

B. 45; XO

C. 46; XX

D. 47; XYY

Ans: B

8. Excess of amino acids is broken down to form urea in:

A. Kidney

B. Liver

C. Spleen

D. Rectum

Ans: A