भारतीय विमानपत्तन प्राधिकरण
(मिनी रत्न - श्रेणी - 1 सार्वजनिक क्षेत्र का उद्दम)
AIRPORTS AUTHORITY OF INDIA
(Schedule – 'A' Mini Ratna – Category – 1 Public Sector Enterprise)

Section : **General Knowledge**

Q.1 What is the number of self-help groups of tribal gatherers constituted under the Van Dhan Yojana?

Ans ✗ 1. 50

✗ 2. 19

✗ 3. 5

✔ 4. 10

Question ID : **5096471141**
Status : **Answered**
Chosen Option : **4**

Q.2 Census 2011 was the _____ census of its kind which has been conducted in India since 1872.

Ans ✗ 1. 14th

✔ 2. 15th

✗ 3. 11th

✗ 4. 16th

Question ID : **5096471150**
Status : **Answered**
Chosen Option : **4**

Q.3 As per the Economic Survey 2017-18, the average decline in rainfall in India between the 1970's and 2000's is _____ in the Kharif season.

Ans ✗ 1. 36mm

✗ 2. 46mm

✗ 3. 16mm

✔ 4. 26 mm

Question ID : **5096471149**
Status : **Answered**
Chosen Option : **3**

Q.4 A saltwater lake separated from the sea by the sandbars and spits is called a:

Ans ✔ 1. lagoon

✗ 2. glacier

✗ 3. lake

✗ 4. estuary

Q.5 Who among the following started the newspaper 'Sambad Kaumudi'?

Ans ✔ 1. Raja Ram Mohan Roy

✘ 2. Shishir Kumar Ghosh

✘ 3. Rash Bihari Bose

✘ 4. Ishwar Chandra Vidyasagar

Question ID : 5096471147
Status : Answered
Chosen Option : 2

Q.6 _____ is the phenomenon of movement of a species from its own habitat to some other habitat for a particular time period every year for a specific purpose like breeding.

Ans ✘ 1. Hibernation

✘ 2. Mobilisation

✔ 3. Migration

✘ 4. Adaptation

Question ID : 5096471144
Status : Answered
Chosen Option : 3

Q.7 What was the rank of India in FDI Confidence Index 2018 released by AT Kearney?

Ans ✘ 1. 21st

✘ 2. 51st

✔ 3. 11th

✘ 4. 9th

Question ID : 5096471142
Status : Answered
Chosen Option : 1

Q.8 Which team won the Indian Premier League 2018 title?

Ans ✔ 1. Chennai Super Kings

✘ 2. SunRisers Hyderabad

✘ 3. Royal Challengers Bangalore

✘ 4. Rajasthan Royals

Question ID : 5096471143
Status : Answered
Chosen Option : 3

Q.9 To which state does the Bagh style of textile art printing belong?

Ans ✘ 1. Telangana

✘ 2. Kerala

✘ 3. Gujarat

✔ 4. Madhya Pradesh

Q.10 According to Article 143 of the Constitution of India, the _____ has the power to consult the Supreme Court.

Ans ✘ 1. Speaker of the Lok Sabha

✘ 2. Prime Minister of India

✘ 3. Governor

✔ 4. President of India

Section : **General Intelligence**

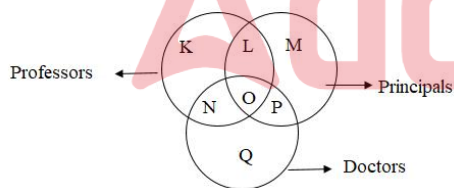**Q.1** Choose the correct alternative that will replace the question mark in the given number series:

7, 23, 47, ?, 119, 167
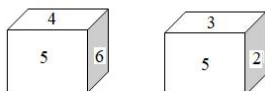
Ans ✘ 1. 95

✘ 2. 81

✘ 3. 71

✔ 4. 79

Q.2 In the following Venn diagram, identify the letter that denotes Principals who are also Doctors, but NOT Professors.

Ans ✘ 1. N

✘ 2. O

✔ 3. P

✘ 4. L

Q.3 Two positions of the same cube are shown below. Determine which face of the cube will have the hidden number, from these two figures.

Ans ✘ 1. Opposite of '4'

✔ 2. Opposite of '5'

✘ 3. Opposite of '3'

✘ 4. Opposite of '6'

Question ID : **5096471153**
Status : **Answered**
Chosen Option : **2**

Q.4 Monica has a brother Sukam. Monica's husband, Raunak, is the only brother of Neerja. Esha is Neerja's only niece.
How is Esha related to Sukam?

Ans ✘ 1. Daughter

✔ 2. Niece

✘ 3. Sister

✘ 4. Cousin

Question ID : **5096471159**
Status : **Answered**
Chosen Option : **1**

Q.5 If 'JLUGNYUC' is the code for INTIMATE, which word is coded as QPJTBRF?

Ans ✘ 1. PRIMATE

✘ 2. PRIMAGE

✘ 3. PRIVACY

✔ 4. PRIVATE

Question ID : **5096471165**
Status : **Answered**
Chosen Option : **4**

Q.6 Select the option that is different from the other three.

Ans ✔ 1. SXUP

✘ 2. PVRN

✘ 3. FLHD

✘ 4. MSOK

Question ID : **5096471157**
Status : **Answered**
Chosen Option : **1**

Q.7 Select the option that is related to the third term in the same way as the second term is related to the first term.

QNKH : WTQN:: PMJG : ?

Ans ✘ 1. VTPM

✘ 2. PMVS

✘ 3. VSON

✔ 4. VSPM

Question ID : **5096471161**
Status : **Answered**
Chosen Option : **4**

Q.8 A man is facing eastwards and turns 45° anticlockwise, again 180° anticlockwise and then turns 225° clockwise. In
which direction is he facing now?

Ans

✔ 1. East

✘ 2. South-east

✘ 3. West

✘ 4. North-east

Question ID : **5096471151**

Status : **Answered**

Chosen Option : **1**

Q.9 Five friends are taking part in a race. Manu runs faster than Neeraj. Arsh runs faster than Manu. Neeraj runs faster than Sonu but slower than Prashant. Prashant is NOT as fast as Manu. Based on the data given, who is most likely to win the race?

Ans

✘ 1. Neeraj

✔ 2. Arsh

✘ 3. Manu

✘ 4. Prashant

Question ID : **5096471160**

Status : **Answered**

Chosen Option : **2**

Q.10 'Dreamland' is related to 'Utopia' in the same way as 'Earth' is related to:

Ans

✘ 1. People

✔ 2. Terra Firma

✘ 3. Rocks

✘ 4. Soil

Question ID : **5096471156**

Status : **Answered**

Chosen Option : **1**

Q.11 Select the option that will replace the question mark in the below letter series.
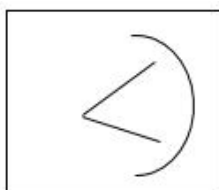
TZJ, PWH, LTF, ? , DNB

Ans

✘ 1. GPD

✔ 2. HQD

✘ 3. HPD

✘ 4. GRE

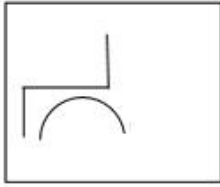Question ID : **5096471163**

Status : **Answered**

Chosen Option : **2**

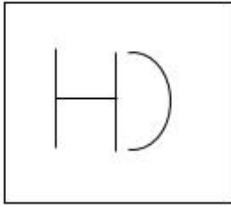**Q.12** Select the figure that is different from the other three figures.

Ans

✔ 1.

✗ 2.

✗ 3.

✗ 4.
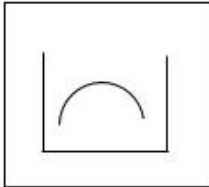
Q.13 From the given alternatives, select the word that CANNOT be formed using the letters of the given word.

REVOLUTION

Ans ✗ 1. OUTLINE

✗ 2. ROUTINE

✔ 3. RATION

✗ 4. VIOLENT

Q.14 Select the number pair that is different from the other three.

Ans ✔ 1. 79-19

✗ 2. 129-31

✗ 3. 97-23

✗ 4. 161-39

Q.15 Find the number of quadrilaterals in the given figure:
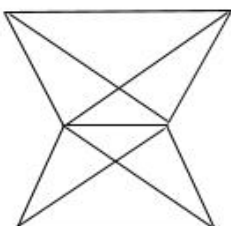
Ans ✗ 1. 11

✗ 2. 6

✗ 3. 8

✓ 4. 9

Question ID : **5096471155**

Status : **Answered**

Chosen Option : **4**

Section : **General Aptitude**

Q.1 60% employees of a company are females and 25% of them earn more than ₹ 50,000 per month. If 45% of all the employees earn more than ₹ 50,000 per month, then the percentage of male employees earning ₹ 5000 or less is:

Ans ✗ 1. 20

✓ 2. 25

✗ 3. 30

✗ 4. 28

Question ID : **5096471170**

Status : **Answered**

Chosen Option : **4**

Q.2 A boat takes 0.5 h more to travel a distance of 45 km upstream than to travel the same distance downstream. If the speed of the boat in still water is 4 times the speed of the stream, then in what time will it cover a distance of 72 km downstream?

Ans ✗ 1. $1\frac{2}{5}$ h

✗ 2. $2\frac{1}{6}$ h

✗ 3. $2\frac{1}{3}$ h

✓ 4. $1\frac{1}{5}$ h

Question ID : **5096471178**

Status : **Answered**

Chosen Option : **3**

Q.3 A sum invested at compound interest amounts to ₹ 3,136 in two years and ₹ 3,512.32 in 3 years at a certain rate percentage per annum, when the interest is compounded annually. What will the same sum amount to at the same rate in $2\frac{2}{3}$ years, interest compounded annually (nearest to one rupee)?

Ans ✓ 1. ₹ 3,387

✗ 2. ₹ 3,378

✗ 3. ₹ 3,487

✗ 4. ₹ 3,478

Question ID : **5096471175**
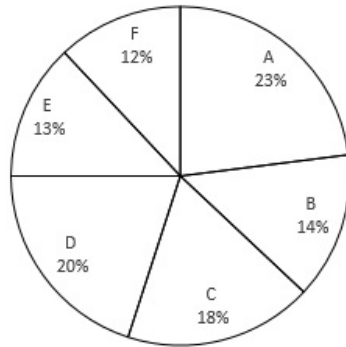
Status : **Answered**

Chosen Option : **4**

Q.4 If $\frac{1}{\sqrt{2}+\sqrt{3}-\sqrt{5}} + \frac{1}{\sqrt{2}-\sqrt{3}-\sqrt{5}} + \frac{(3^4)^4 \times 9^6}{(27)^7 \times 3^8} = a + b\sqrt{2}$, then the value of $(3a + 2b)$ will be:

Ans ✗ 1. 3

✗ 2. 1

✗ 3. 4

✓ 4. 2

Q.5 Study the following a pie chart and table and answer question.

Percentagewise Distribution of Students in Different
Schools in 2016

F 12%
A 23%
E 13%
B 14%
D 20%
C 18%

Number of Students = 4,500

School	Percentage of students having height less than 150 cm
A	40
B	70
C	60
D	54
E	80
F	65

In which school is the number of students having height 150 cm or
more the same as the number of students in school A having height less
than 150 cm?

Ans ✗ 1. E

✔ 2. D

✗ 3. F

✗ 4. B

Q.6

The value of $\dfrac{\left(174\frac{3}{5}\right)^2 - \left(137\frac{7}{10}\right)^2}{312\frac{3}{10}}$ of $\dfrac{5}{41} \times \left[6 - \left(2\frac{3}{4} - \frac{11}{12}\right)\right]$ is:

Ans ✗ 1. 16.75

✔ 2. 18.75

✗ 3. 20.25

✗ 4. 17.25

Q.7 The marked price of an article is ₹ 1,650. A shopkeeper allows a discount of 10% and gets a profit of 10%. If he sells it
at ₹ 1,593, the profit percentage will be:

Ans ✔ 1. 18%
   ✘ 2. 12.5%
   ✘ 3. 15.5%
   ✘ 4. 20%

Question ID : **5096471173**
Status : **Answered**
Chosen Option : **2**

Q.8 If $66\frac{2}{3}$% goods are sold at a 30% profit, 25% goods are sold at a 16% profit and the rest at a 48% loss, there is a profit of ₹ 180. The cost price of the goods is:

Ans ✘ 1. ₹ 1,080
   ✘ 2. ₹ 840
   ✔ 3. ₹ 900
   ✘ 4. ₹ 720

Question ID : **5096471172**
Status : **Answered**
Chosen Option : **2**

Q.9 Water flows at 2.5 km/h through a pipe of radius 3.5 cm into a rectangular tank of length 10 m and breadth 8.8 m. The time (in hours) in which the level of water in the tank will rise by 42 cm is:
$\left(Take\ \pi = \frac{22}{7}\right)$

Ans ✘ 1. 3.48
   ✘ 2. 3.24
   ✘ 3. 3.96
   ✔ 4. 3.84

Question ID : **5096471177**
Status : **Answered**
Chosen Option : **1**

Q.1 At the beginning of a year, the ratio of the number of boys of age up to 16 years to these over 16 years was 8 : 5. At the
0 end of the year, the ratio became 6 : 7 as 40 boys had reached the age of 16 years by then. What is the total number of boys in the school if NO boy left or got admission during the year?

Ans ✘ 1. 273
   ✔ 2. 260
   ✘ 3. 286
   ✘ 4. 247

Question ID : **5096471171**
Status : **Answered**
Chosen Option : **3**

Q.1 Let x be the greatest number which is such that when 3288, 10139 and 19200 are divided by it, the remainder in each
1 case is the same. What is the sum of the digits of x ?

Ans ✘ 1. 6
   ✘ 2. 7
   ✘ 3. 11
   ✔ 4. 5

Question ID : **5096471169**
Status : **Answered**
Chosen Option : **2**

Q.12 The two adjacent sides of a parallelogram are 130 cm and 140 cm and one of its diagonals is 150 cm long, and the sum of the parallel sides of a trapezium is 1,050 cm. If its area is equal to the area of the parallelogram, then the perpendicular distance between the parallel sides of the trapezium will be:

Ans ✗ 1. 36 cm

✗ 2. 30 cm

✔ 3. 32 cm

✗ 4. 28 cm

Question ID : **5096471176**
Status : **Answered**
Chosen Option : **3**

Q.13 Study the following a pie chart and table and answer question.

Percentagewise Distribution of Students in Different Schools in 2016
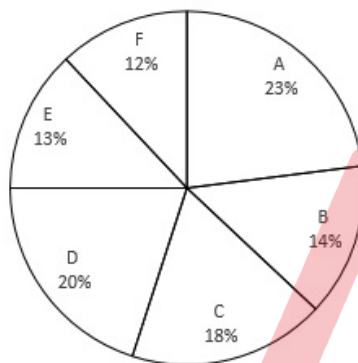
Number of Students = 4,500

School	Percentage of Students having height less than 150 cm
A	40
B	70
C	60
D	54
E	80
F	65

The total number of students in school A and F having height 150 cm or more is what percentage of the total number of students in C, D and E having height less than 150 cm?

Ans ✗ 1. 55.5

✗ 2. 52.75

✔ 3. 56.25

✗ 4. 54.5

Question ID : **5096471180**
Status : **Answered**
Chosen Option : **2**

Q.14 The average of twelve numbers is 55.5. The average of the first four is 53.4 and that of next four is 54.6. The 10th number is greater than the 9th number by 3 but less than the 11th and the 12th numbers by 2 and 3 respectively. What is the average of the 9th and 11th numbers?

Ans ✗ 1. 57

✗ 2. 56

✗ 3. 56.6

✓ 4. 57.5

Question ID : **5096471174**
Status : **Answered**
Chosen Option : **4**

Q.1 5 The value of $\frac{[(1.3)^2+(1.3\times1.5)+(1.5)^2]\times[(1.3)^2-1.95+(1.5)^2]}{(1.3)^4+(1.3)^2(2.25)+(1.5)^4}$ is:

Ans ✗ 1. 0

✗ 2. 0.2

✓ 3. 1

✗ 4. 1.8

Question ID : **5096471167**
Status : **Answered**
Chosen Option : **3**

Section : **General English**

Q.1 Select the wrongly spelt word.

Ans ✓ 1. leuitenant

✗ 2. license

✗ 3. liberate

✗ 4. literature

Question ID : **5096471196**
Status : **Answered**
Chosen Option : **1**

Q.2 Select the most appropriate option to fill in the blank.

_____ two people were seriously injured in the accident, the first thing I did was to call an ambulance.

Ans ✗ 1. Unless

✗ 2. In case

✓ 3. Since

✗ 4. Even if

Question ID : **5096471187**
Status : **Answered**
Chosen Option : **2**

Q.3 Select the option which is NOT an antonym of another word by way of adding the prefix 'dis-'

Ans ✗ 1. disreputable

✓ 2. distinguish

✗ 3. dissatisfaction

✗ 4. disproportionate

Question ID : **5096471194**
Status : **Answered**
Chosen Option : **2**

Q.4

Select the most appropriate ANTONYM of the given word.

DECEIT

Ans ✗ 1. Fraud

✔ 2. Honesty

✗ 3. Trick

✗ 4. Pretence

| Question ID : **5096471193** |
| Status : **Answered** |
| Chosen Option : **1** |

Q.5 Select the most appropriate option to fill in the blank.

The youngest child of the family was the _____.

Ans ✔ 1. most successful

✗ 2. as successful

✗ 3. more successful

✗ 4. successful

| Question ID : **5096471183** |
| Status : **Answered** |
| Chosen Option : **1** |

Q.6 Select the most appropriate option to fill in the blank.

_____ being hungry, she couldn't eat the food served in that restaurant.

Ans ✗ 1. Whether

✗ 2. In case

✗ 3. Because

✔ 4. In spite of

| Question ID : **5096471188** |
| Status : **Answered** |
| Chosen Option : **4** |

Q.7 Select the most appropriate direct form of the given sentence.

She told me that when she had heard that she had won the poetry recitation competition the previous day, she had jumped with joy.

Ans ✗ 1.

She said to me, "When I heard that she had won the poetry recitation competition yesterday, I jumped with joy."

✔ 2.

She said to me, "When I heard that I had won the poetry recitation competition yesterday, I jumped with joy."

✗ 3.

She said to me, "When she had heard that she had won the poetry recitation competition the previous day, she had jumped with joy."

✗ 4.

She said to me, "When I heard that I had won the poetry recitation competition yesterday, I had been jumping with joy."

| Question ID : **5096471200** |
| Status : **Answered** |
| Chosen Option : **4** |

Q.8

Select the most appropriate synonym of the given word.

DILEMMA

Ans ✗ 1. Price

     ✗ 2. Condition

     ✗ 3. Solution

     ✔ 4. Problem

Question ID : **5096471191**
Status : **Answered**
Chosen Option : **2**

Q.9 Select the correctly spelt word.

Ans ✗ 1. equelibrium

     ✗ 2. equilbriam

     ✔ 3. equilibrium

     ✗ 4. equillibrium

Question ID : **5096471195**
Status : **Answered**
Chosen Option : **4**

Q.1 0 Select the most appropriate option to fill in the blank.

In the last quarter, the company made a good profit but in this quarter it _____ well.

Ans ✗ 1. hadn't done

     ✔ 2. hasn't done

     ✗ 3. doesn't do

     ✗ 4. wasn't doing

Question ID : **5096471182**
Status : **Answered**
Chosen Option : **1**

Q.1 1 Select the most appropriate synonym of the given word.

ABSCOND

Ans ✔ 1. Flee

     ✗ 2. Come

     ✗ 3. Evict

     ✗ 4. Remain

Question ID : **5096471192**
Status : **Answered**
Chosen Option : **3**

Q.1 2 Select the most appropriate option to fill in the blank.

After the interview, when I looked back, I was annoyed with _____ for not answering a question properly.

Ans ✗ 1. yourself

     ✗ 2. himself

3. myself ✓

4. themselves ✗

Question ID : **5096471186**
Status : **Answered**
Chosen Option : **3**

Q.13 In the following sentence, four words or phrases have been underlined. One of them is incorrect. Choose the INCORRECT word or phrase from the given options.

Pharmaceutical exports from the country is expected to cross $19 billion in worth during the current financial year.

Ans ✗ 1. during

✗ 2. in worth

✗ 3. from

✓ 4. is expected

Question ID : **5096471197**
Status : **Answered**
Chosen Option : **2**

Q.14 Select the most appropriate option to fill in the blank.

Last evening while I _____ a walk in the park, I met Mrs Murty.

Ans ✗ 1. have taken

✗ 2. took

✗ 3. take

✓ 4. was taking

Question ID : **5096471181**
Status : **Answered**
Chosen Option : **4**

Q.15 Select the most appropriate INDIRECT form of the given sentence.

I said to him, "In winter, I am going to visit Cambodia with my family."

Ans ✓ 1.
I told them that in winter I was going to visit Cambodia with my family.

✗ 2.
I told them that in winter I am going to visit Cambodia with my family.

✗ 3.
I told them that in winter he was going to visit Cambodia with his family.

✗ 4.
I told them that in winter I would be going to visit Cambodia with my family.

Question ID : **5096471199**
Status : **Answered**
Chosen Option : **1**

Q.16 Select the most appropriate option to fill in the blank.

In the rainy season, there are many _____ caterpillars in the garden.

Ans ✗ 1. small velvety red and black

✔ 2. small red and black velvety

✘ 3. red and black small velvety

✘ 4. velvety small red and black

Question ID : **5096471184**
Status : **Answered**
Chosen Option : **2**

Q.17 Select the correct passive form of the given sentence.

The fall in the rupee will hit the importers as the cost of getting goods or equipment into India will increase.

Ans ✘ 1.

The importers would be hit by the fall in the rupee as the cost of getting goods or equipment into India will be increased.

✘ 2.

The importers are being hit by the fall in the rupee as the cost of getting goods or equipment into India is increasing.

✘ 3.

The goods or equipment will be hit by the fall in the rupee as the cost of getting importers into India will increase.

✔ 4.

The importers will be hit by the fall in the rupee as the cost of getting goods or equipment into India will increase.

Question ID : **5096471189**
Status : **Answered**
Chosen Option : **1**

Q.18 Select the correct active form of the given sentence.

A student leader was attacked by an unidentified youth yesterday outside the Constitution Club.

Ans ✘ 1.

A student leader attacked an unidentified youth yesterday outside the Constitution Club.

✘ 2.

An unidentified youth had been attacking a student leader yesterday outside the Constitution Club.

✔ 3.

An unidentified youth attacked a student leader yesterday outside the Constitution Club.

✘ 4.

An unidentified youth was attacking a student leader yesterday outside the Constitution Club.

Question ID : **5096471190**
Status : **Answered**
Chosen Option : **4**

Q.19 Select the most appropriate option to fill in the blank.

It is my granddaughter's birthday today. I am going to get _____ a puppy.

Ans ✘ 1. him

✔ 2. her

✘ 3. you

✘ 4. it

Question ID : **5096471185**
Status : **Answered**
Chosen Option : **2**

Q.20 In the following sentence, four words or phrases have been underlined. One of them is incorrect. Choose the INCORRECT word or phrase from the given options.

There can hardly be <u>nothing</u> worse <u>than</u> reaching a cinema hall and <u>discovering</u> that the tickets <u>have been left</u> at home.

Ans ✘ 1. have been left

✔ 2. nothing

✗ 3. than

✗ 4. discovering

Section : **Discipline**

Q.1 A partial differential equation formed from the relation

$z = (x^2 + a)(y^2 + b)$ will be:

Ans ✔ 1. $\dfrac{\partial z}{\partial x}\dfrac{\partial z}{\partial y} = 4xyz$

✗ 2. $\dfrac{\partial z}{\partial x}\dfrac{\partial z}{\partial y} = 4xy$

✗ 3. $\dfrac{\partial z}{\partial x} + \dfrac{\partial z}{\partial y} = 4xyz$

✗ 4. $\dfrac{\partial z}{\partial x} - \dfrac{\partial z}{\partial y} = 4xy$

Q.2 The longest wavelength that can be analysed by a NaCl crystal of interplanar spacing 0.282 nm between its principal planes, in the first order, is:

Ans ✗ 1. 0.654 nm

✔ 2. 0.564 nm

✗ 3. 0.969 nm

✗ 4. 0.282 nm

Q.3 An electron and a proton have the same kinetic energy. Then, the ratio of de Broglie wavelengths of proton and electron will be nearly:

Ans ✔ 1. 1 : 43

✗ 2. 1 : 1838

✗ 3. 1838 : 1

✗ 4. 43 : 1

Q.4 The energy equivalent of mass associated with the rest mass of an electron, is nearly:

Ans ✗ 1. 1.02 MeV

✔ 2. 0.51 MeV

✗ 3. 2.04 MeV

✗ 4. 931.5 MeV

Q.5 The value of $\int \frac{2x}{(x^2+1)(x^3+3)}\,dx$ will be_____ where c is an arbitrary constant.

Ans

✔ 1. $\frac{1}{2}\log\frac{x^2+1}{x^2+3}+c$

✘ 2. $\frac{1}{2}\log\frac{x^2-1}{x^2+1}+c$

✘ 3. $2\log\frac{x+1}{x-1}+c$

✘ 4. $2\log\frac{2x+1}{2x-1}+c$

Question ID : **5096471251**
Status : **Answered**
Chosen Option : **1**

Q.6 A linear transformation $T : \mathbb{R}^2 \to \mathbb{R}^2$ first reflects points through the vertical axis (y-axis) and then reflects points through the line $x = y$. The standard matrix of T is:

Ans

✘ 1. $\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$

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

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

✘ 4. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

Question ID : **5096471256**
Status : **Answered**
Chosen Option : **4**

Q.7 If the interval of differencing is 1, then the value of $\Delta\sin 4x$ will be:

Ans

✔ 1. $2(\sin 2)(\cos 2(2x+1))$

✘ 2. $2(sin2)(sin2(x+2))$

✘ 3. $2(cos4)(sin2(x+2))$

✘ 4. $2(\cos 2)(cos2(2x-1))$

Question ID : **5096471258**
Status : **Answered**
Chosen Option : **1**

Q.8 Consider two subsets of $\mathbb{R}^3$ given as

$S_1 = \{[1,-1,2],[3,2,-1]\}$ and $S_2 = \{[2,7,-3],[-6,-21,9]\}$. Then:

Ans

✘ 1. neither S_1 and S_2 can be enlarged to a basis for $\mathbb{R}^3$.

✔ 2.

S_1 can be enlarged but S_2 cannot be enlarged to a basis for $\mathbb{R}^3$.

✘ 3.

S_1 cannot be enlarged but S_2 can be enlarged to a basis for $\mathbb{R}^3$.

✗ 4. both S_1 and S_2 can be enlarged to a basis for $\mathbb{R}^3$.

Question ID : **5096471257**
Status : **Answered**
Chosen Option : **3**

Q.9 Which of the following materials is used for the generation of ultrasonic waves by using piezoelectric effect?

Ans ✗ 1. Copper

✔ 2. Quartz

✗ 3. Aluminium

✗ 4. Iron

Question ID : **5096471218**
Status : **Answered**
Chosen Option : **2**

Q.10 For the data,

x: 0 1 2 3 4
$f(x)$: 5 2 1 3 7

the value of $\int_0^4 2f(x)dx$ will be:

Ans ✔ 1. 24

✗ 2. 21

✗ 3. 42

✗ 4. 12

Question ID : **5096471259**
Status : **Answered**
Chosen Option : **1**

Q.11 The value of $\lim\limits_{x\to 0} \frac{e^x - 1}{x^3}$ is:

Ans ✗ 1. $\frac{-1}{6}$

✗ 2. $-\infty$

✔ 3. ∞

✗ 4. $\frac{1}{6}$

Question ID : **5096471232**
Status : **Answered**
Chosen Option : **4**

Q.12 The length of the arc of the curve $r = f(\theta)$ between the points, where $\theta = \alpha$ and $\theta = \beta$, is:

Ans ✔ 1. $\int_\alpha^\beta \sqrt{r^2 + \left(\frac{dr}{d\theta}\right)^2}\ d\theta$

✗ 2. $\int_\alpha^\beta \sqrt{1 + (r\sin\theta)^2}\ d\theta$

✗ 3. $\int_{\alpha}^{\beta} \sqrt{1 + \left(\frac{dr}{d\theta}\right)^2} \, d\theta$

✗ 4. $\int_{\alpha}^{\beta} \sqrt{r + \left(r \frac{dr}{d\theta}\right)^2} \, d\theta$

Q.13 For what value of β, do the simultaneous equations

$7x + 2y = -3$

$14x + 6y = \beta$

have a unique value?

Ans ✔ 1. for all real values of β

✗ 2. $\beta = 0$

✗ 3. $\beta \neq -6$

✗ 4. $\beta = -6$

Q.14 The general solution of $\frac{a \, dx}{(b-c)yz} = \frac{b \, dy}{(c-a)zx} = \frac{c \, dz}{(a-b)xy}$ will be_____, where c_1 and c_2 are arbitrary constants.

Ans ✗ 1. $ax^2 + by^2 - cz^2 = c_1, \, a^2x^2 - b^2y^2 + c^2z^2 = c_2$

✗ 2. $ax + by + cz = c_1, \, ax^2 - by^2 - cz^2 = c_2$

✔ 3. $ax^2 + by^2 + cz^2 = c_1, \, a^2x^2 + b^2y^2 + c^2z^2 = c_2$

✗ 4. $ax - by + cz = c_1, \, ax^2 + by^2 - cz^2 = c_2$

Q.15 Which of the following statements is true?

Ans ✗ 1.

For an infinite series,
Uniform convergence ⇒ Absolute convergence, but the converse need not be true.

✔ 2.

There is no relation between absolute and uniform convergence of an infinite series.

✗ 3.

An infinite series will be either absolute convergent or uniformly convergent but not both.

✗ 4.

For an infinite series,
Absolute convergence ⇒ Uniform convergence, but the converse need not be true.

Q.16 In a dielectric material, the polarisation vector P, the displacement vector D and the electric field vector E are related as:

Ans   ✗ 1. $\varepsilon_0 E = D + P$

     ✗ 2. $P = E - \varepsilon_0 D$

     ✗ 3. $P = \varepsilon_0 E + D$

     ✔ 4. $P = D - \varepsilon_0 E$

	Question ID : **5096471224**
	Status : **Answered**
	Chosen Option : **3**

Q.17 On gradually decreasing the distance between the slits in Fresnel's biprism experimental arrangement, the fringe width in the interference pattern obtained using monochromatic light source:

Ans   ✗ 1. first increases and then decreases

     ✗ 2. decreases

     ✔ 3. increases

     ✗ 4. remains the same

	Question ID : **5096471221**
	Status : **Answered**
	Chosen Option : **3**

Q.18 When a beam of ordinary light is incident on a rectangular glass plate at a polarising angle, the resulting reflected and refracted beams are:

Ans   ✔ 1. perpendicular to each other

     ✗ 2. inclined at angle 45^0

     ✗ 3. inclined at an angle 60^0

     ✗ 4. parallel to each other

	Question ID : **5096471222**
	Status : **Answered**
	Chosen Option : **1**

Q.19 The concept of displacement current was proposed by:

Ans   ✗ 1. Faraday

     ✗ 2. Biot-Savart

     ✗ 3. Ampere

     ✔ 4. Maxwell

	Question ID : **5096471203**
	Status : **Answered**
	Chosen Option : **3**

Q.20 Hard magnetic materials like tungsten–steel alloy or chromium–steel alloy are used in the manufacture of:

Ans   ✗ 1. dynamo core

     ✔ 2. permanent magnets

     ✗ 3. transformer core

     ✗ 4. electromagnets

	Question ID : **5096471229**
	Status : **Answered**
	Chosen Option : **2**

Q.2 1 Which of the following particles, moving with the same velocity, has the shortest wavelength?

Ans   ✗ 1. A neutron

   ✔ 2. An alpha-particle

   ✗ 3. A proton

   ✗ 4. An electron

Question ID : **5096471201**
Status : **Answered**
Chosen Option : **2**

Q.2 2 The de Broglie wavelength λ associated with an electron of mass m and accelerated by an electric potential V is:

Ans   ✔ 1. $h / (\sqrt{2meV})$

   ✗ 2. $h / \sqrt{meV}$

   ✗ 3. $m / (\sqrt{2ehV})$

   ✗ 4. $h / (2meV)$

Question ID : **5096471206**
Status : **Answered**
Chosen Option : **1**

Q.2 3 In a biprism experimental arrangement, an obtuse angle and two acute angles of the Fresnel's biprism respectively are nearly:

Ans   ✗ 1. 179°; 1° each

   ✗ 2. 180°; 30′ each

   ✔ 3. 179°; 30′ each

   ✗ 4. 180°; 1° each

Question ID : **5096471217**
Status : **Answered**
Chosen Option : **1**

Q.2 4 The value of $\int_0^{\frac{\pi}{2}} sin^8 x \, cos^4 x \, dx$ will be:

Ans   ✗ 1. $\dfrac{6\pi}{343}$

   ✗ 2. $\dfrac{5\pi}{1024}$

   ✗ 3. $\dfrac{7\pi}{1024}$

   ✔ 4. $\dfrac{7\pi}{2048}$

Question ID : **5096471248**
Status : **Answered**
Chosen Option : **2**

Q.2 5 In an ultrasonic pulse echo technique, the ultrasonic pulse travels with velocity 5.941 km/s in a steel bar of thickness 22 mm. Then, the echo time of the ultrasonic pulse is nearly:

Ans   ✗ 1. 5.4 μs

✗ 2. 6.4 μs

✓ 3. 7.4 μs

✗ 4. 8.4 μs

Question ID : **5096471219**
Status : **Answered**
Chosen Option : **4**

Q.2 6 In a Fresnel's biprism arrangement, monochromatic light of wavelength 550 nm is used to obtain interference fringe pattern on the screen. When a thin, transparent glass sheet of refractive index 1.52 is introduced in the path of one of the interfering beams, ten interference fringes are found to be shifted. Then, the thickness of the glass sheet is nearly:

Ans ✗ 1. 2.4 μm

✗ 2. 24.6 μm

✓ 3. 10.6 μm

✗ 4. 6.4 μm

Question ID : **5096471214**
Status : **Answered**
Chosen Option : **1**

Q.2 7 Suppose that $X = \langle x_m \rangle$, $Y = \langle y_n \rangle$, $Z = \langle z_n \rangle$ are sequences of real numbers such that $x_n \leq y_n \leq z_n$ for all $n \in \mathbb{N}$, and that $\lim \langle x_n \rangle = \lim \langle z_n \rangle$. Then:

Ans ✗ 1. Y is convergent and $\lim \langle x_n \rangle < \lim \langle y_n \rangle < \lim \langle z_n \rangle$

✗ 2. Y is divergent

✗ 3. Y is convergent and $\lim \langle z_n \rangle < \lim \langle y_n \rangle < \lim \langle x_n \rangle$

✓ 4. Y is convergent and $\lim \langle x_n \rangle = \lim \langle y_n \rangle = \lim \langle z_n \rangle$

Question ID : **5096471238**
Status : **Answered**
Chosen Option : **1**

Q.2 8 Consider two series $\sum_{n=1}^{\infty}(-1)^{n-1}a_n$ and $\sum_{n=2}^{\infty}(-1)^{n-1}b_n$, where $a_n = \frac{1}{\sqrt{n}}$, $b_n = \frac{x^n}{n(n-1)}$, $0 < x < 1$. Then:

Ans ✗ 1.
$\sum_{n=1}^{\infty}(-1)^{n-1}a_n$ is convergent but $\sum_{n=2}^{\infty}(-1)^{n-1}b_n$ is divergent.

✓ 2. both series are convergent.

✗ 3.
$\sum_{n=1}^{\infty}(-1)^{n-1}a_n$ is divergent but $\sum_{n=2}^{\infty}(-1)^{n-1}b_n$ is convergent.

✗ 4. both series are divergent.

Question ID : **5096471240**
Status : **Answered**
Chosen Option : **1**

Q.2 9 The solution of difference equation $u_{n+1} - 2u_n cos\theta + u_{n-1} = 0$ will be _____, where c_1 and c_2 are constants.

Ans ✗ 1. $u_n = (c_1 + c_2 n) \sin n\theta + \cos n\theta$

✗ 2. $u_n = (c_1 + c_2 n) \cos n\theta + \sin n\theta$

✗ 3. $u_n = (-1)^n[c_1 \cos(n-1)\theta + c_2 \sin(n-1)\theta]$

✓ 4. $u_n = c_1 \cos n\theta + c_2 \sin n\theta$

Q.3 0 On keeping a paramagnetic material in a magnetic field, the magnetic flux density inside the material is likely to:

Ans ✔ 1. increase

✘ 2. decrease

✘ 3. reduce to zero

✘ 4. remain the same

Q.3 1 Which of the following materials is used in memory cores of computers?

Ans ✘ 1. Ferromagnetic

✘ 2. Diamagnetic

✘ 3. Paramagnetic

✔ 4. Ferrite

Q.3 2 A monochromatic light beam is incident on a set of two polaroids, a polariser A and an analyser B. Then, the analyser B is adjusted and set to maximum transmitted intensity. In order to block the monochromatic light completely with the help of the polaroids, the angle between their transmission axes should be:

Ans ✘ 1. $135°$

✘ 2. $45°$

✔ 3. $90°$

✘ 4. $60°$

Q.3 3 General solution of partial differential equation

$y^2\frac{\partial z}{\partial x} - xy\frac{\partial z}{\partial y} = x(z - 2y)$ will be_____, where φ is an arbitrary function.

Ans ✘ 1. $\varphi(x^3 - x^2y, x + y + z) = 0$

✔ 2. $\varphi(x^2 + y^2, y^2 - yz) = 0$

✘ 3. $\varphi(x^2 + xy, y + z) = 0$

✘ 4. $\varphi(x^2 - y^3, y - z) = 0$

Q.3 4 X-rays can be deflected by:

Ans

✗ 1. electric field

✔ 2. none of the fields

✗ 3. magnetic field

✗ 4. electromagnetic field

Q.3 5 The equation

$$xy\frac{\partial^2 z}{\partial x^2} - (x^2 - y^2)\frac{\partial^2 z}{\partial x \partial y} - xy\frac{\partial^2 z}{\partial y^2} + y\frac{\partial z}{\partial x} - x\frac{\partial z}{\partial y} = 2(x^2 - y^2)$$ is classified as:

Ans

✗ 1. elliptic

✔ 2. hyperbolic for all $x, y (\neq 0)$

✗ 3. parabolic

✗ 4. hyperbolic for $x = 0$, $y = 0$; elsewhere parabolic

Q.3 6 If the sum of eigenvalues of matrix $A = \begin{bmatrix} 16 & 9 & 7 \\ -9 & k^2 & 3 \\ 5 & 16 & 9 \end{bmatrix}$ is 29, then the possible values of k will be:

Ans

✗ 1. 3, −2

✔ 2. 2, −2

✗ 3. 3, −3

✗ 4. 2, 3

Q.3 7 Which of the following statements is FALSE?

Ans

✗ 1.

The union of an arbitrary collection of non-empty open sets is an open set.

✔ 2.

The union of an arbitrary non-empty collection of closed sets is closed.

✗ 3.

The intersection of a finite collection of open sets is an open set.

✗ 4.

The intersection of an arbitrary non-empty collection of closed sets is a closed set.

Q.3 8

Consider the following two sequences,

$X = \{-1, 1, -1, 1, ...\}$ and

$Y = \left\{1, \frac{1}{2}, 3, \frac{1}{4}, ...\right\}$.
Then:

Ans ✔ 1. both X and Y are divergent.

✗ 2. both X and Y are convergent.

✗ 3. X is convergent but Y is divergent.

✗ 4. X is divergent but Y is convergent.

Question ID : **5096471237**
Status : **Answered**
Chosen Option : **1**

Q.3 9 A magnetic material has a magnetization of 2350 A/m and produces a flux density of 3.142 mWb/m². Then, the relative permeability of the material is:

Ans ✗ 1. 11.67

✗ 2. 17.47

✗ 3. 12.47

✔ 4. 16.67

Question ID : **5096471230**
Status : **Answered**
Chosen Option : **2**

Q.4 0 Consider two functions $y_1(x) = x$ and $y_2(x) = |x|$. Then:

Ans ✗ 1. both functions are linearly dependent on the real line.

✗ 2.
$y_1(x)$ is linearly independent but $y_2(x)$ is linearly dependent on the real line.

✗ 3.
$y_1(x)$ is linearly dependent but $y_2(x)$ is linearly independent on the real line.

✔ 4. both functions are linearly independent on the real line.

Question ID : **5096471242**
Status : **Answered**
Chosen Option : **3**

Q.4 1 Circular patches are often observed on the ground when sunlight filters through the space between the leaves of a tree. This arises due to the optical phenomenon of:

Ans ✗ 1. scattering

✔ 2. diffraction

✗ 3. interference

✗ 4. polarisation

Question ID : **5096471220**
Status : **Answered**
Chosen Option : **1**

Q.4 2 Which of the following is true?

Ans ✗ 1. $\int_0^{2a} f(x)dx = \int_0^a f(x)dx$, if $f(2a - x) = -f(x)$

✗ 2. $\int_0^{2a} f(x)dx = 2\int_0^a f(x)dx$, if $f(2a-x) = -f(x)$

✗ 3. $\int_0^{2a} f(x)dx = \frac{1}{2}\int_0^a f(x)dx$, if $f(2a-x) = -f(x)$

✔ 4. $\int_0^{2a} f(x)dx = 0$, if $f(2a-x) = -f(x)$

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Question ID : **5096471250**
Status : **Answered**
Chosen Option : **1**

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Q.43 According to quantum mechanics, a moving material particle is associated with:

Ans

✔ 1. a wave packet

✗ 2. light wave

✗ 3. a single wave

✗ 4. acoustic wave

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Question ID : **5096471215**
Status : **Answered**
Chosen Option : **3**

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Q.44 In a dispersive medium, the group velocity is:

Ans

✔ 1. less than the phase velocity only

✗ 2. equal to the phase velocity only

✗ 3.
more than the phase velocity, depending on the nature of the dispersive medium

✗ 4. more than the phase velocity

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Question ID : **5096471205**
Status : **Answered**
Chosen Option : **4**

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Q.45 The solution of differential equation $x^2\frac{d^2y}{dx^2} + 4x\frac{dy}{dx} + 2y = 0$ will be _____, where c_1 and c_2 are constants.

Ans

✗ 1. $y = c_1 + c_2 x^2$

✔ 2. $y = \frac{c_1}{x} + \frac{c_2}{x^2}$

✗ 3. $y = c_1 \cos x + c_2 \sin x$

✗ 4. $y = c_1 x + c_2 x^2$

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Question ID : **5096471244**
Status : **Answered**
Chosen Option : **2**

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Q.46 The interval of convergence of the series

$\sum \left(\frac{3^{2n}}{n}\right)(x-1)^n$ is:

Ans

✗ 1. $\left(\frac{2}{3}, \frac{2}{5}\right)$

✔ 2. $\left[\frac{8}{9}, \frac{10}{9}\right)$

✗ 3. $\left(\frac{2}{3}, \frac{5}{3}\right]$

✗ 4. $\left(\frac{7}{9}, \frac{16}{9}\right)$

Q.47 Schrodinger wave equation can be written as:

Ans ✗ 1. H ψ + E ψ = 0

✗ 2. E ψ = 0

✔ 3. H ψ - E ψ = 0

✗ 4. H ψ = 0

Q.48 The resolving power of a plane transmission diffraction grating will increase on increasing:

Ans ✗ 1. the grating element only

✗ 2. the order of the spectrum only

✗ 3. the total number of rulings on the grating only

✔ 4.

both order of the spectrum and total number of rulings on the grating

Q.49 A general solution of the differential equation $(x + y)\frac{dy}{dx} = x - y$ will be _____ where c is a constant.

Ans ✗ 1. $x^2 + xy + y^2 = c$

✔ 2. $x^2 - 2xy - y^2 = c$

✗ 3. $2x^2 + xy + y^2 = c$

✗ 4. $x^2 + 2xy - y^2 = c$

Q.50 Which of the following waves CANNOT be polarised?

Ans ✔ 1. Acoustic waves

✗ 2. Light waves

✗ 3. X- rays

✗ 4. Radio waves

Q.5 1 Which of the following statements is true?

Ans ✗ 1.

$\int \sqrt{x^2 - a^2}\, dx = \frac{x\sqrt{x^2-a^2}}{2} + \frac{a}{2}\log\left|x - \sqrt{x^2 - a^2}\right| + c$, where c is an arbitrary constant.

✗ 2.

$\int \sqrt{a^2 - x^2}\, dx = \frac{\sqrt{a^2-x^2}}{2} + \frac{a}{2}\sin^{-1}x + c$, where c is an arbitrary constant.

✔ 3.

$\int \sqrt{a^2 + x^2}\, dx = \frac{x\sqrt{a^2+x^2}}{2} + \frac{a^2}{2}\sinh^{-1}x + c$, where c is an arbitrary constant.

✗ 4.

$\int \sqrt{x^2 - a^2}\, dx = \frac{\sqrt{x^2-a^2}}{2} + \frac{a^2}{2}\sinh^{-1}x + c$, where c is an arbitrary constant.

Question ID : **5096471252**
Status : **Answered**
Chosen Option : **1**

Q.5 2 If $\sin u = \frac{x^3 + y^3}{\sqrt{x}+\sqrt{y}}$, then $x\, u_x + y\, u_y$ will be equal to:

Ans ✔ 1. $\frac{5}{2}\tan u$

✗ 2. $\frac{3}{2}\tan u$

✗ 3. $\frac{1}{2}\cot u$

✗ 4. $\frac{3}{2}\cot u$

Question ID : **5096471233**
Status : **Answered**
Chosen Option : **2**

Q.5 3 Newton's rings, observed in an optical interference experimental set-up, are loci of points of:

Ans ✗ 1. unequal thickness and equal inclination

✔ 2. equal thickness only

✗ 3. both equal inclination and equal thickness

✗ 4. equal inclination only

Question ID : **5096471207**
Status : **Answered**
Chosen Option : **3**

Q.5 4 The approximate solution of the system of simultaneous equations
$5x - 2y + z = -1$
$3x + 4y - 2z = 2$
$4x - y + 3z = 4$
by applying Gauss-Jacobi method one time (using initial approximation as $x = 0, y = 0, z = 0$) will be:

Ans ✗ 1. $x = 1.25, y = 2.275, z = -3.72$

✗ 2. $x = -1.5, y = -3.25, z = 1.275$

✗ 3. $x = 1.5, y = -2.375, z = 2.234$

✔ 4. $x = -0.2, y = 0.5, z = 1.33$

> Question ID : **5096471260**
> Status : **Answered**
> Chosen Option : **3**

Q.5 5 For which of the following colours of monochromatic light, the fringe width in the interference fringe pattern observed in a Fresnel's biprism experiment will be maximum?

Ans ✘ 1. Green

✔ 2. Red

✘ 3. Yellow

✘ 4. Blue

> Question ID : **5096471209**
> Status : **Answered**
> Chosen Option : **2**

Q.5 6 An observer moves with a speed of 0.86 C towards a stationary source of light in air. The speed of light would appear to the observer to be:

Ans ✔ 1. C

✘ 2. 1.2 c

✘ 3. 0.5 c

✘ 4. 0.8 c

> Question ID : **5096471225**
> Status : **Answered**
> Chosen Option : **3**

Q.5 7 A tube of length 20 cm containing sugar solution rotates the plane of polarization by 11^0. If the specific rotation of sugar is 66^0, the strength of the sugar solution is:

Ans ✘ 1. 0.0667 g/cc

✔ 2. 0.0833 g/cc

✘ 3. 0.0400 g/cc

✘ 4. 0.0886 g/cc

> Question ID : **5096471226**
> Status : **Answered**
> Chosen Option : **1**

Q.5 8 The longitudinal waves whose frequencies lie below 20 Hz are:

Ans ✔ 1. infrasonic waves

✘ 2. ultrasonic waves

✘ 3. hypersonic waves

✘ 4. audible waves

> Question ID : **5096471223**
> Status : **Answered**
> Chosen Option : **4**

Q.5 9 For a complex variable $\mathbb{Z}$, if $f(\mathbb{Z}) = \begin{cases} \dfrac{\mathbb{Z}}{|\mathbb{Z}|}, & for\ \mathbb{Z} \neq 0 \\ 0, & for\ \mathbb{Z} = 0 \end{cases}$ then:

✗ $\lim_{Z \to 0} f(Z) = 1$

✔ 2. $f(Z)$ is discontinuous at origin.

✗ 3. $f(Z)$ is continuous at origin.

✗ 4. $\lim_{Z \to 0} f(Z) = i$

Q.6
0

Consider two subsets of $\mathbb{R}^3$ given as $S_1 = \{[7,7,7]\}$ and $S_2 = \{[0,0,0]\}$. Which of the following statements is true?

Ans

✗ 1. Both S_1 and S_2 are linearly independent.

✔ 2. S_1 is linearly independent but S_2 is linearly dependent.

✗ 3. S_1 is linearly dependent but S_2 is linearly independent.

✗ 4. Both S_1 and S_2 are linearly dependent.