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MATHEMATICS

Time allowed: 1 Hours 15 Minutes

Maximum Marks: 40

General Instructions:

Read the following instructions very carefully and strictly follow them:

- (i) This question paper comprises **two** parts – **A** and **B**.
 - (ii) There are **19** questions in the question paper. **All** questions are compulsory.
 - (iii) **Part – A**
 - 1. It consists **two sections** - I and II.
 - 2. Section I has **9** questions of **1** mark each. Internal choice is provided in **2** questions.
 - 3. Section II has **2** questions on case study. Each case study has **5** case-based sub-parts. An examinee is to attempt any **4** out of **5** sub-parts.
 - (iv) **Part – B**
 - 1. Question No **12** to **14** carry **2** marks each.
 - 2. Question No **15** to **18** carry **3** marks each
 - 3. Question No **19** is of **5** marks.
 - 4. Internal choice is provided in **1** question of **2** marks, **1** question of **3** marks and **1** question of **5** marks.
 - (v) Use of calculators is **not** permitted.
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PART - A

Section - I

Section I has 9 questions of 1 mark each. Internal choice is provided in 2 questions.

1. What is the generalized form of a three-digit number xyz . 1

OR

Count the number of cubes in the given shape.



2. What is the product of a non-zero rational number and its reciprocal? **1**
3. Find the simplified value of $(-2)^{2 \times 3 - 1}$. **1**
4. Let a and b are digits and $a > b$. By which number(s), the difference $ab - ba$ is always divisible? **1**
5. Write a rational number between two rational numbers x and y . **1**
6. Height of a building is 9 m and this building is represented by 9 cm on a map. What is the scale used for the map? **1**
7. A four-digit number $aabb$ is divisible by 55. Find the possible value(s) of b . **1**
8. Write 0.000064 in standard form. **1**

OR

If $5 \times A = CA$, find the values of A and C .

9. Find the value of $(6^0 - 7^0) \times (6^0 + 7^0)$. **1**

Section-II

Case study based questions are compulsory. Attempt any four sub parts of each question. Each subpart carries 1 mark.

10. Case Study based – 1
Euler's formula

Euler's formula states that, for any polyhedron, $F + V - E = 2$ where F stands for number of faces, V stands for number of vertices and E stands for number of edges.

- (i) A polyhedron has 7 faces and 10 vertices. How many edges does the have? **1**
(A) 6 (B) 4 (C) 8 (D) 2
- (ii) Find the number of vertices in a polyhedron which has 30 edges and 12 faces. **1**
(A) 6 (B) 4 (C) 8 (D) 2

(iii) A polyhedron has 60 edges and 40 vertices. Find the number of its faces. 1

(A) 6 (B) 4 (C) 8 (D) 2

(iv) In a solid if $F = V = 5$, then the number of edges in this shape is 1

(A) 6 (B) 4 (C) 8 (D) 2

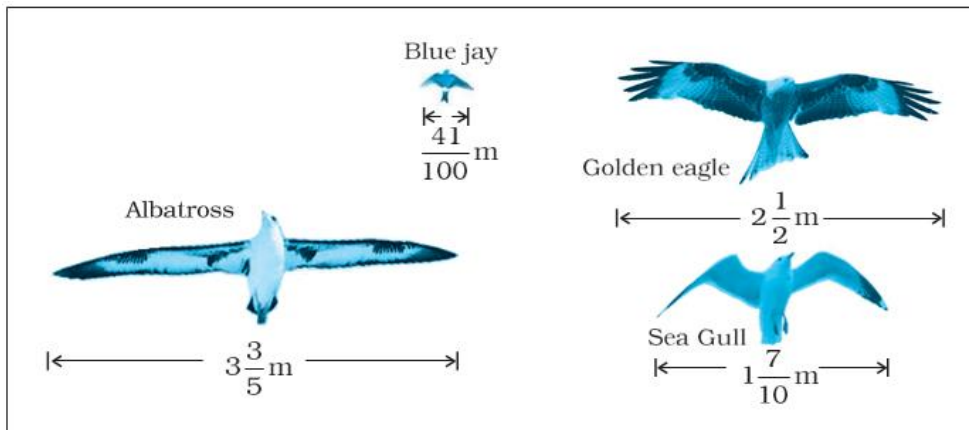
(v) Which of the following cannot be true for a polyhedron? 1

(A) $V = 4, F = 4, E = 6$ (B) $V = 6, F = 8, E = 12$

(C) $V = 20, F = 12, E = 30$ (D) $V = 4, F = 6, E = 6$

11. Case Study based – 2
Length of the wingspans

The diagram shows the wingspans of different species of birds. Use the diagram to answer the question given below:



(i) How much longer is the wingspan of an Albatross than the wingspan of a Sea gull? 1

(A) $1\frac{9}{10}$ m (B) $1\frac{7}{10}$ m (C) $1\frac{4}{5}$ m (D) $1\frac{3}{5}$ m

(ii) How much shorter is the wingspan of a Sea gull than the wingspan of a Golden eagle? 1

(A) $\frac{9}{10}$ m (B) $\frac{7}{10}$ m (C) $\frac{4}{5}$ m (D) $\frac{3}{5}$ m

(iii) Find the sum of the wingspan of an Albatross and a Blue jay 1

(A) $4\frac{11}{100}$ m (B) $4\frac{7}{100}$ m (C) $4\frac{1}{100}$ m (D) $4\frac{3}{100}$ m

(iv) Find the difference of the wingspan of a Golden eagle and Blue jay 1

(A) $2\frac{19}{100}$ m (B) $2\frac{13}{100}$ m (C) $2\frac{1}{100}$ m (D) $2\frac{9}{100}$ m

- (v) Find the average length of the wingspan of a Golden eagle and Sea gull 1
- (A) $2\frac{1}{5}$ m (B) $2\frac{7}{10}$ m (C) $2\frac{3}{10}$ m (D) $2\frac{1}{10}$ m

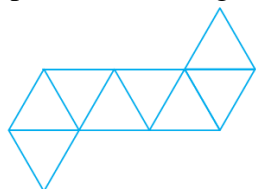
PART - B

All questions are compulsory. In case of internal choices, attempt any one.

12. Find the value of $\frac{-4}{5} \times \frac{3}{7} \times \frac{15}{16} \times \left(\frac{-14}{9}\right)$. 2
13. A three-digit number $2a3$ is added to the number 326 to give a three-digit number $5b9$ which is divisible by 9 . Find the value of $b - a$. 2

OR

Identify the shape whose net is given below.

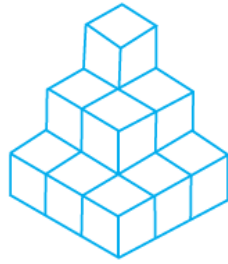


14. Simplify $(-3)^4 \times \left(\frac{5}{3}\right)^4$ and write the answer in the exponential form. 2
15. If $24x$ is a multiple of 3 , where x is a digit, what is the value of x ? What if it is divisible by 9 ? 3
16. Let O , P and Z represent the numbers 0 , 3 and -5 respectively on the number line. Points Q , R and S are between O and P such that $OQ = QR = RS = SP$. What are the rational numbers represented by the points Q , R and S . Next choose a point T between Z and O so that $ZT = TO$. Which rational number does T represent? 3

OR

In a polyhedron, number of vertices is $1\frac{2}{7}$ times the number of faces. Find the number of vertices and faces, if there are 14 edges in the polyhedron.

17. Simplify the expression $\frac{2}{5} \times \frac{-3}{7} - \frac{1}{14} - \frac{3}{7} \times \frac{3}{5}$. 3
18. Draw the front, side and top view of the given shape. 3

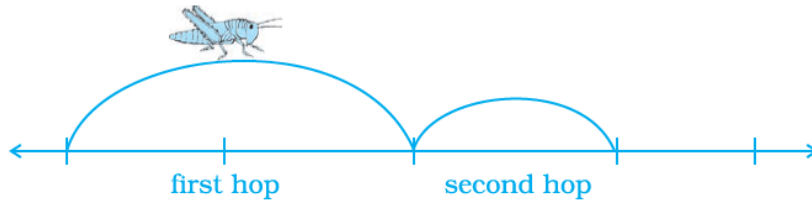


19. Work out the multiplication 12345679×9 . Use the result to answer the following questions. 5

- (a) What will be 12345679×45 ?
- (b) What will be 12345679×63 ?
- (c) By what number should 12345679 be multiplied to get 888888888?
- (d) By what number should 12345679 be multiplied to get 999999999?

OR

An insect is on the 0 point of a number line, hopping towards 1. She covers half the distance from her current location to 1 with each hop. So, she will be at $\frac{1}{2}$ after one hop, $\frac{3}{4}$ after two hops, and so on.



- (a) Make a table showing the insect's location for the first 10 hops.
- (b) Where will the insect be after n hops?
- (c) Will the insect ever get to 1? Explain.

Rational Numbers
 # Exponents and Powers
 # Visualising Solid Shapes
 # Playing with Numbers