



EFFORT CLASSES

Dare to Dream !.... Dreams come true !

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Q.P code-1910/IMPE4

X ICSE

Date: 17/02/20

Time – 2 hr

MATHEMATICS

Marks-80

Section – A

Question 1.

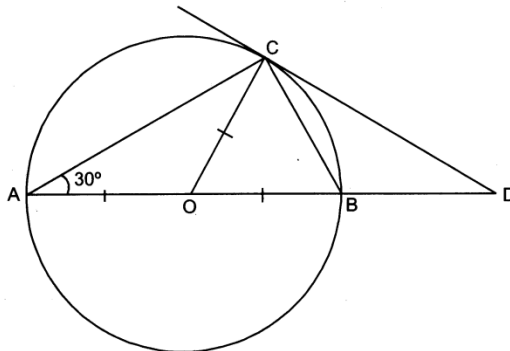
- (a) If the lines $y = 3x + 7$ and $2y + px = 3$ are perpendicular to each other, find the value of p .
- (b) If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, find $A^2 - 5A - 7I$.
- (c) Solve the inequation : $12 + \frac{11x}{6} \leq 5 + 3x$, $x \in \mathbb{R}$. Represent the solution on the number line.

Question 2.

- (a) Solve the following equation by factorization : $x(2x + 1) = 6$.
- (b) Given that $x + 2$ and $x + 4$ are factors of $3x^3 + ax^2 - 6x - b$. Determine the values of a and b .
- (c) A bag contains 6 red balls and some blue balls. If the probability of drawing a blue ball is twice that of a red ball, find the number of blue balls in the bag.

Question 3.

- (a) The printed price of an AC is ₹ 50000. The wholesaler gives a discount of 10% to a dealer who sells it to a consumer at a discount of 5% on the marked price. If the sales are intra-state and the rate of GST is 15%, find :
- the amount of tax (under GST) paid by the dealer to the Central and the State Governments.
 - the amount of tax received by Central and the State Governments.
 - the total amount, inclusive of tax paid by the consumer.
- (b) In the given figure, AB is a diameter and AC is a chord of the circle such that $\angle BAC = 30^\circ$. The tangent at C intersects AB produced at D. Prove that $BC = BD$.



- (c) Point A(4, -1) is reflected as A' in Y-axis, point B on reflection in X-axis is mapped as B'(-2, 5). Write the coordinates of A' and B. Write the coordinates of the middle point of a line segment A'B.

Question 4.

- (a) The sum of the first 20 terms of a G.P. is 244 times the sum of its first 10 terms. Find the common ratio.

- (b) Mr. Gupta opened a recurring deposit account in a bank. He deposited ₹ 2500 per month for 2 years. At the time of maturity he got ₹ 67500. Find (i) the total interest earned by Mr. Gupta, (ii) the rate of interest per annum.
- (c) Find the mode and median of the following frequency distribution :

X	10	11	12	13	14	15
f	1	4	7	5	9	3

Section – B

Question 5.

- (a) Find the equation of a line passing through (2, -2) and is perpendicular to the line joining (-3, 1) and (1, -2).

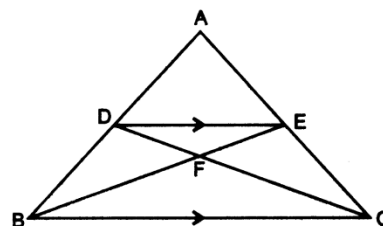
- (b) In the given figure ABC is a triangle, $DE \parallel BC$ and $\frac{AD}{DB} = \frac{3}{2}$.

(i) Find $\frac{AD}{AB}$.

- (ii) Prove that the triangle ADE is similar to triangle ABC and find $\frac{DE}{BC}$.

- (iii) Prove that $\triangle DEF \sim \triangle CFB$.

- (iv) Find the value of $\frac{\text{area of } \triangle DFE}{\text{area of } \triangle DEC}$.



- (c) If the mean of 6, 7, 4, p , 10 is 8. Find the value of p .

Question 6.

- (a) Find the sum of all the multiples of 13 between 750 and 1000.

- (b) Find the value of a, b, c and d , if $6 \begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} a & 6 \\ -1 & 2d \end{bmatrix} + \begin{bmatrix} 2 & a-b \\ c+d & 3 \end{bmatrix}$.

- (c) A company with 4000 shares of nominal value of ₹ 110 each declares an annual dividend of 15%. Calculate :

- (i) The total amount of dividend paid by the company,
 (ii) The annual income of a man who holds 88 shares in the company,
 (iii) If he received only 10% on his investment, find the price he paid for each share.

Question 7.

- (a) A positive number is divided into two parts such that the sum of the squares of the two parts is 208. The square of the larger part is 18 times the smaller part. Taking x as the smaller part of the two parts, find the number.
- (b) The surface area of a solid metallic sphere is 2464 cm^2 . It is melted and recast into solid right circular cones of radius 3.5 cm and height 7 cm. Calculate :
- (i) The radius of the sphere,
 (ii) The number of cones recast.

Question 8.

- (a) Without solving the equation $x^2 + 2(m-1)x + (m+5) = 0$, find the value of m for which the roots are real and equal.

- (b) Find the missing frequencies in the following frequency distribution if it is known that the mean of the distribution is 1.46.

No. of accidents	0	1	2	3	4	5	Total
Frequency	46	?	?	25	10	5	200

- (c) A die has 6 faces marked by the given numbers as shown : 1, 2, 3, -1, -2, -3. The die is thrown once. What is the probability of getting :
- A positive integer,
 - An integer greater than -3,
 - The smallest integer.

Question 9.

- (a) The following table shows the distribution of the heights of a group of factory workers.

Height in cm	150-155	155-160	160-165	165-170	170-175	175-180	180-185
No. of workers	6	12	18	20	13	8	6

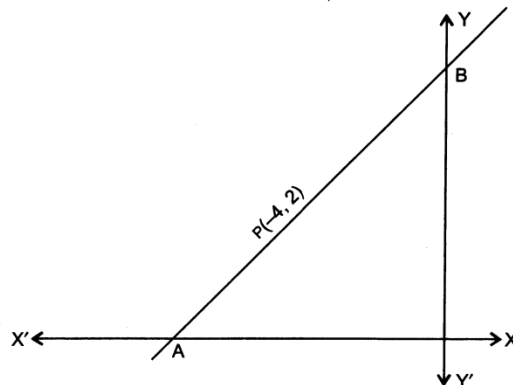
- Determine the cumulative frequency.
 - Draw the cumulative frequency curve on a graph paper.
 - From your graph, write down the median height in centimetres.
- (b) From the top of a hill, the angles of depression of two consecutive kilometer stones, due east .06 are found to be 30° and 45° respectively. Find the distance of the two stones from the foot of the hill.

Question 10.

- (a) Find the mean proportional between $5\frac{1}{4}$ and $9\frac{1}{3}$.
- (b) A straight line AB is 8 cm long. Locate by construction the locus of a point which is :
- Equidistant from A and B.
 - Always 4 cm from the line AB.
 - Mark two points X and Y, which are 4 cm from AB and equidistant from A and B.
 - Name the figure AXBY.
- (c) Prove that : $1 - \frac{\cos^2 \theta}{1 + \sin \theta} = \sin \theta$.

Question 11.

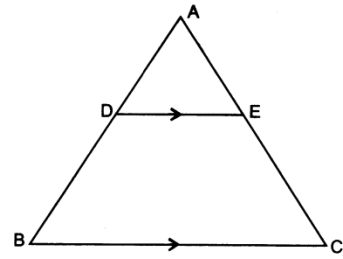
- (a) In the given figure, line APB meets the X-axis at A, Y-axis at B. P is the point (-4, 2) and $AP : PB = 1 : 2$. Write down the co-ordinates of A and B.



- (b) In the given figure, DE is parallel to BC and $AD : DB = 2 : 3$.

Calculate the value of

- (i) $\frac{\text{Area of } \triangle ADE}{\text{Area of } \triangle ABC}$.
- (ii) $\frac{\text{Area of trapezium DBCE}}{\text{Area of } \triangle ABC}$.



- (c) Draw a line $AB = 5$ cm. Mark a point C on AB such that $AC = 3$ cm. Using a ruler and a compass only, construct :
- (i) A circle of radius 2.5 cm, passing through A and C.
- (ii) Construct two tangents to the circle from the external point B. Measure and record the length of the tangents.
