



VIVEK TUTORIALS

Mathematics
Preliminary Examination
Max Marks: 80

Date : 10/Feb/2019

Grade: 10th (ICSE)

Time: 2 Hours

SECTION A (40 Marks) Attempt all Questions from this section

Question 1

- (a) Find the first terms of the G.p. with second term = 2 and sum of infinite terms = 8. [3]
(b) P and Q have co-ordinates (0, 5) and (-2, 4). [4]
(a) P is invariant when reflected in an axis. Name the axis.
(b) Find the image of Q on reflection in the axis found in (i).
(c) (0, k) on reflection in the origin is invariant. Write the value of k.
(d) Write the co-ordinates of the image of Q, obtained by reflecting it in the origin followed by reflection in x-axis.
(c) Two natural numbers differ by 3. Find the numbers, if the sum of their reciprocals is $\frac{7}{10}$ [3]

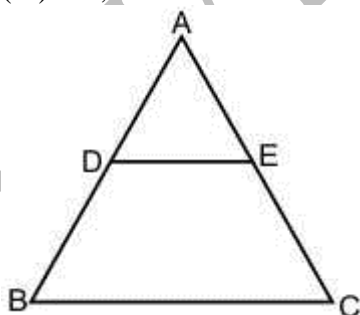
Question 2

- (a) The angle of elevation of the top of an unfinished tower at a point distance 80 m from its base is 30° . [3]
How much higher must the tower be raised so that its angle of elevation at the same point may be 60° ?
(b) The price of an article is Rs 8,250 which includes Sales Tax at 10%. Find how much more or less [4]
does a customer pay for the article, if the Sales Tax on the article:
(i) increases to 15% (ii) decreases to 6%
(iii) increases by 2% (iv) decreases by 3%.
(c) In a malaria epidemic, the number of cases diagnosed were as follows : [3]
On what days does the mode, the upper and the lower quartiles occur ?

Date (July)	1	2	3	4	5	6	7	8	9	10	11	12
Number	5	12	20	27	46	30	31	18	11	5	0	1

Question 3

- (a) Which term of the A.P. 4.2, 4.7, 5.2, 5.7, Is 8.7? [3]
(b) In the below figure; $DE \parallel BC$ and D divides AB in the ratio 2 : 3. Find : [4]
(i) AE/EC
(ii) AE/AC
(iii) DE, if $BC = 7.5$ cm.

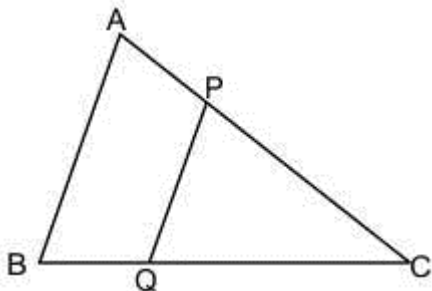


- (c) A purchases an article for Rs 3,600 and sells it to B for Rs 4,800. B, in turn, sells the article to C for [3]
Rs 5,500. If the sales-tax (under VAT) is 10%, find the VAT levied on A and B.

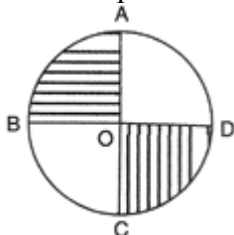
Question 4

- (a) State the locus of a point in a rhombus ABCD, which is equidistant [3]
(i) from AB and AD;
(ii) from the vertices A and C.

- (b) In the given figure, $PQ \parallel AB$; $CQ = 4.8$ cm $QB = 3.6$ cm and $AB = 6.3$ cm. Find: [4]
 (i) CP/PA (ii) PQ (iii) If $AP = x$, then the value of AC in terms of x .



- (c) AC and BD are two perpendicular diameters of a circle with centre O . If $AC = 16$ cm, calculate the area and perimeter of the shaded part. (Take $\pi = 3.14$.) [3]



SECTION B (40 Marks)

Attempt any FOUR Questions from this section

Question 5

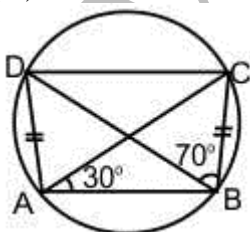
- (a) A solid metal sphere is cut through its centre into 2 equal parts. If the diameter of the sphere is $3\frac{1}{2}$ cm, find the total surface area of each part correct to two decimal places. [3]
 (b) Construct a regular hexagon of side 4 cm. Construct a circle circumscribing the hexagon. [3]
 (c) A Company with 4000 shares of nominal value of Rs 110 declares annual dividend of 15% calculate: (i) the total amount of dividend paid by the company; (ii) the annual income of Shah Rukh who holds 88 shares in the company; (iii) if he received only 10% on his investment, find the price Shah Rukh paid for each share. [4]

Question 6

- (a) Draw a histogram to represent the following: [3]

Class interval	0-8	8-16	16-24	24-32	32-40
Frequency	6	9	12	10	5

- (b) In the figure, given below, $AD = BC$, $\angle BAC = 30^\circ$ and $\angle CBD = 70^\circ$. [4]
 Find:
 (i) $\angle BCD$
 (ii) $\angle BCA$
 (iii) $\angle ABC$
 (iv) $\angle ADB$



- (c) State the co-ordinates of the following points under reflection in x-axis: [3]
 (i) (3, 2) (ii) (-5, 4) (iii) (0, 0)

Question 7

- (a) If $(x + 3) : (4x + 1)$ is the duplicate ratio of 3 : 5, find the value of x . [4]
 (b) Attempt this question on graph paper. [6]

Table below shows the distribution of marks gained by a group of 400 students in an examination :
 Using a scale of 2 cm to represent 10 marks and 2 cm to represent 50 students, plot these points and draw a smooth curve through the points.

Estimate from the graph : (i) Median marks (ii) Quartile marks

Marks less than :	10	20	30	40	50	60	70	80	90	100
No. of students :	5	10	30	60	105	180	270	355	390	400

Question 8

- (a) Given M is the mid-point of AB, find the co-ordinates of A; if $M = (1, 7)$ and $B = (-5, 10)$. [3]
- (b) Using a graph paper, plot the points $A(6,4)$ and $B(0,4)$. [4]
- (i) reflect A and B in the origin to get the images A' and B'
- (ii) Write the co-ordinates of A' and B'
- (iii) State the geometrical name for the figure $ABA'B'$
- (iv) Find its perimeter.
- (c) (a) Find the means of 7, 11, 6, 5, and 6. [3]
- (b) If each number given in (a) is diminished by 2; find the new value of mean.

Question 9

- (a) Calculate the ratio in which the line joining the points $(4, 6)$ and $(-5, -4)$ is divided by the line $y = 3$. Also, find the co-ordinates of the point of intersection. [3]
- (b) The centres of two circles with radii 6 cm and 2 cm are 10 cm apart. Calculate the length of the transverse common tangent. [4]
- (c) Draw a circle of radius 3 cm. Mark a point P at a distance of 5 cm from the centre of the circle drawn. Draw two tangents PA and PB to the given circle and measure the length of each tangent. [3]

Question 10

- (a) A bag contains 10 red balls, 16 white balls and 8 green balls. A ball is drawn out of the bag at random. What is the probability that the ball drawn will be : [3]
- (i) not red ?
- (ii) neither red nor green ?
- (iii) white or green ?
- (b) How many terms of the A.P. 43, 39, 35, be taken so that their sum is 252 ? [4]
- (c) A line $5x + 3y + 15 = 0$ meets y-axis at point P. Find the co-ordinates of point P. Find the equation of a line through P and perpendicular to $x - 3y + 4 = 0$. [3]

Question 11

- (a) Find the sum of the geometric series : $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \dots$ Upto 12 terms. [3]
- (b) Prove the following identities: [4]
- (i) $\sin^4 A - \cos^4 A = 2 \sin A - 1$
- (ii) $(1 - \tan A)^2 + (1 + \tan A)^2 = 2 \sec^2 A$
- (c) Given : $A = \{x : -8 < 5x + 2 \leq 17, x \in I\}$ [3]
- $B = \{x : -2 \leq 7 + 3x < 17, x \in R\}$

Where $R = \{\text{real numbers}\}$ and $I = \{\text{integers}\}$.

Represent A and B on two different number lines. Write down the elements of $A \cap B$.

----- All the Best -----