

A. All questions are compulsory.
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B. The **Question Paper** consists of **30 Questions** divided into **Four** sections **A, B, C and D**.

C. **Section A** contains **6 Questions** of **1** mark each.

D. **Section B** contains **6 Questions** of **2** marks each.

E. **Section C** contains **10 Questions** of **3** marks each.

F. **Section D** contains **8 Questions** of **4** marks each.

G. There is no overall choice. However, an **Internal choice** has been provided in **Four** questions of **3 Marks** each and **Three** questions of **4 Marks** each. You have to attempt only one of the alternatives in all such questions.

H. Use of **Calculators** is not permitted.

Section A

1

E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that $\triangle ABE \sim \triangle CFB$.

[1]

2

Find the roots of the quadratic equation $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$

[1]

3

For what value of k will k+9, 2k-1 and 2k+7 are the consecutive terms of an A.P?

[1]

4

Determine if the points (1, 5), (2, 3) and (- 2, - 11) are collinear

[1]

5

Write a rational number between $\sqrt{2}$ and $\sqrt{3}$.

[1]

6

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Section B

7

A card is drawn at random from a well-shuffled pack of 52 playing cards. Find the probability of getting neither a red card nor a queen.

[2]

8

The present age of a father is equal to the sum of the ages of his 5 children. 12 years hence, the sum of the ages of his children will be twice the ages of their father. Find the present age of the father.

[2]

9

Find the largest number which divides 245 and 1029 leaving remainder 5 in each case.

[2]

10

Prove that the points (3, 0), (6, 4) and (-1, 3) are the vertices of a right-angled isosceles triangle.

[2]

11

Three different coins are tossed together. Find the probability of getting

(i) exactly two heads

(ii) at least two heads

(iii) at least two tails.

[2]

12

Three numbers are in A.P. if the sum of these numbers is 27 and the product 585, find the numbers.

[2]

Section C

13

Consider the following distribution of daily wages of 50 workers of a factory.

Daily wages	100-120	120-140	140-160	160-180	180-200
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No. of workers 12

14

8

6

10

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Find the mean daily wages of the workers.

[3]

14

A conical vessel, with base radius 5 cm and height 24 cm, is full of water. This water is emptied into a cylindrical vessel of base radius 10 cm. Find the height to which the water will rise in the cylindrical vessel. ($\pi = 22/7$)

[3]

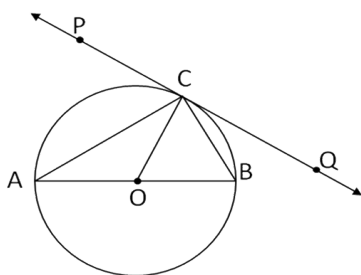
OR

An agriculture field is in the form of a rectangle of length 20 m, and width 14 m. A 10 m deep well of diameter 7 m is dug in a corner of the field and the earth taken out of the well is spread evenly over the remaining part of the field. Find the rise in the level of the field.

[3]

15

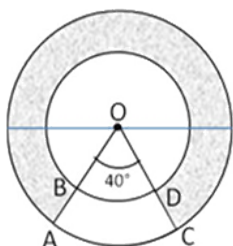
In Fig. , PQ is tangent at point C to a circle with centre O. If AB is a diameter and $\angle CAB = 30^\circ$, find $\angle PCA$.



[3]

16

In Fig. find the area of the shaded region, enclosed between two concentric circles of radii 7 cm and 14 cm where $\angle AOC = 40^\circ$. (use $\pi = 22/7$)



[3]

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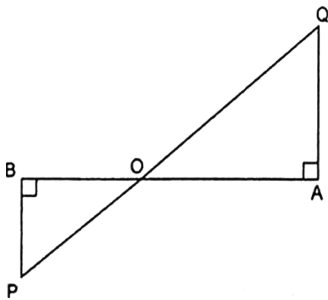
17

Show that $\triangle ABC$, $\triangle DEF$, $\triangle GHI$, $\triangle JKL$, $\triangle MNO$, $\triangle PQR$, $\triangle STU$, $\triangle VWX$, $\triangle YZA$ are similar triangles.

[3]

OR

In the given Fig. PB and QA are perpendiculars to segment AB. If $PO = 5$ cm, $QO = 7$ cm and area $\triangle POB = 150 \text{ cm}^2$ find the area of $\triangle QOA$.



[3]

18

Write the simplest value of

$$\frac{\sin \theta}{\operatorname{cosec} \theta} + \frac{\cos \theta}{\sec \theta}.$$

OR

Express the following in terms of trigonometric ratios of angles lying between 0° and 45°
 $\operatorname{cosec} 54^\circ + \sin 72^\circ$

[3]

19

Prove that $\sqrt{3}$ is irrational.

[3]

20

The points A (4, 7), B (p, 3) and C (7, 3) are the vertices a right triangle, right-angled at B find the value of p.

[3]

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If the coordinates of points A and B are $(-2, -2)$ and $(2, -4)$ respectively, find the coordinates of P such that $AP = \frac{3}{7} AB$, where P lies on the line segment AB.

[3]

21

Tanvika went to a hotel in a town with her big family. They consumed 23 idlies, 15 poories, 7 dosas and 19 vadas. the bill was Rs. 108. Next day they consumed 34 idlies, 8 vadas, 22 poories and 7 dosas. The bill came to Rs. 114 if one idlie cost same as vada. What is the cost of one poori ?

[3]

22

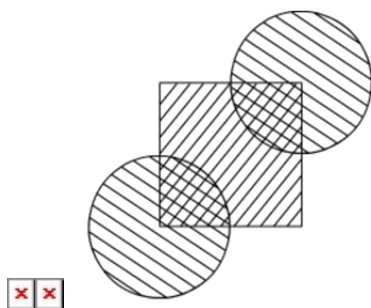
Find all the zeroes of the polynomial $-2\sqrt{2}x^3 - 18x^2 + 24\sqrt{2}x + 72$ given that $2\sqrt{3}x^4$ and $-2\sqrt{3}$ are two of its zeroes.

[3]

Section D

23

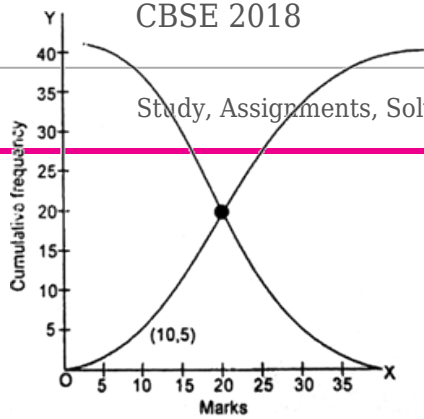
In the given figure, the side of square is 28 cm and radius of each circle is half of the length of the side of the square where O and O' are centres of the circles. Find the area of shaded region.



[4]

24

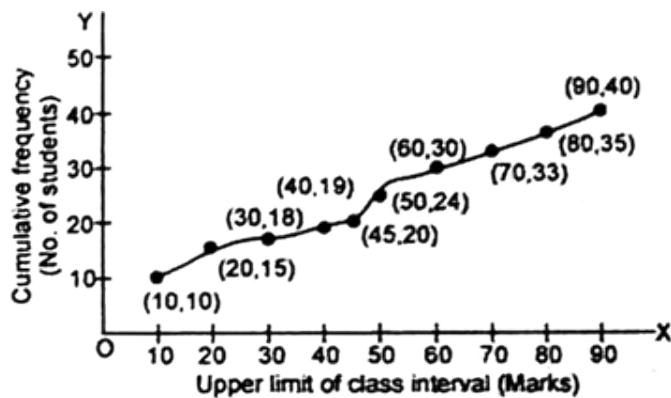
What is the value of the median of the data using the graph in figure, of 'less than' ogive and 'more than ogive'?



[4]

OR

A student draws a cumulative frequency curve for the marks obtained by 40 students of a class as shown below, find the median marks obtained by the students of the class.



[4]

25

Construct a $\triangle ABC$ in which $AB = 6$ cm, $\angle A = 30^\circ$ and $\angle B = 60^\circ$. Construct another $\triangle AB'C'$ similar to $\triangle ABC$ with base $AB' = 8$ cm

[4]

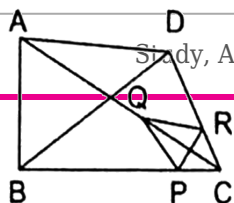
26

The angle of elevation of the top Q of a vertical tower PQ from a point X on the ground is 60° . From a point Y, 40 m vertically above X, the angle of elevation of the top Q of the tower is 45° . Find the height of the tower PQ and the distance PX.
Use $\sqrt{3} = 1.73$

[4]

27

In the given Fig, two triangles ABC and DBC lie on the same side of base BC. P is a point on BC such that $AP \perp BC$ and $DP \perp BC$. Prove that $AD^2 = AC^2 + DB^2 - BC^2$.
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[4]

OR

If the bisector of an angle of a triangle bisects the opposite side, prove that triangle is isosceles.

[4]

28

In right-triangle ABC, right angled at B, if $\cot A = \frac{4}{3}$. Show that $\frac{\cos^2 A - \sin^2 A}{\cos A} = \frac{1 - \tan^2 A}{\sec A}$.

[4]

29

$$\left(4 - \frac{1}{n}\right) + \left(4 - \frac{2}{n}\right) + \left(4 - \frac{3}{n}\right) + \dots$$

Find the sum of n terms of the series

[4]

30

Speed of a boat in still water is 15 km/h. It goes 30 km upstream and returns back at the same point in 4 hours 30 minutes. Find the speed of the stream.

[4]

OR

Solve for x:

$$\frac{1}{x+1} + \frac{2}{x+2} + \frac{4}{x+4}, x \neq -1, -2, -4$$

[4]