St.Gregorios High School
PRELIMINARY EXAMINATIONS CLASS-X
Mathematics (Two hours and a half)
MARKS : 80

Answers to this Paper must be written on the paper provided separately.
You will not be allowed to write during the first 15 minutes.
This time is spent in reading the Question Paper.
The time given at the head of this Paper is the time allowed for writing the answers.

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Section 1 is compulsory .Attempt any four questions from Section 2.
The intended marks for questions or parts of questions are given in brackets

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Section 1(40 marks)

ATTEMPT ALL ? . : QUESTIONS FROM THIS SECTION

Question1

(a) Harshad purchased a car which was quoted at Rs 2,70,000.The shopkeeper charged sales tax at the rate of 10%. Harshad wanted to take the car outside the state,so the shopkeeper charged 2% extra as central sales tax. Find the total amount paid by Harshad. [3]

(b) Solve the following equations by using formula and give your answer correct to 2 decimal places: [3]
$2(x- 1)(x- 5) = 5$

(c) The compound interest calculated yearly on a certain sum of money for the second year is Rs.880 and for the third year it is Rs.968. Find the rate of interest and the original money. [4]

Question 2.

(a) If $x \in Z$, find the solution set in the set builder form for the inequation $5 < 2x - 3 \leq 14$ and graph it on the numberline. [3]

(b) The median of the following observations arranged in ascending order is 25, find x
$11, 12, 14, 18, x+4, x+2, 30, 32, 35, 41$ [3]

(c) Mrs.Desai deposits Rs. 400 per month in a recurring deposit account for three years at the rate of 8% p.a.simple interest.Find the amount she will receive at the time of maturity. [4]

Question 3.

(a) If $(4a+ 9b)(4c- 9d)=(4a- 9b)(4c+9d)$, prove that a,b,c,d are in proportion. [3]

(b) If $x + p$ is the HCF of $x^2+ x -12$ and $2x^2 - 3x - 9$,find the value of p. [3]

(c) Without using trignometrical tables,find the value of

$$\frac{-tanAcot(90 - A) +secAcosec((90 - A) + sin^2 25 + sin^2 65}{tan10\ tan20\ tan70\ tan80}$$ [4]

Question 4.

(a) In a hostel, 45 pupils and 4 teachers take breakfast and 60 pupils and 8 teachers take lunch,breakfast cost Rs.5 per head and lunch cost Rs. 11 per head.Use a matrix method to find the daily expenditure on meals. [3]

(b) Find the equation of the line passing through the point P(-5,1) and parallel to the line joining the points A(7,-1) and B(0,3). [3]

(c) A scale of map is 1:400000.A plot of land of area 64 sq.km is to be on the map.Find

(i) the number of km on the ground which is represented by 1 cm.

(ii)the area in sq.km that can be represented by 1 sq.cm

(iii)the area on the map that represented the plot of land . [4]

Section 2 (40 marks)
(Attempt any four questions from this section)

Question 5.

(a) Find the ratio in which the point (2,a) divides the join of (-4,3) and (6,3).Hence find a. [3]

(b) In the adjoining figure,ABCD is a trapezium in which AB//DC.If 2AB=3DC,find the ratio of the areas of triangleAOB and triangleCOD. [3]
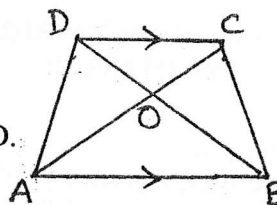
(c) Televisions are produced by the manufacturer P at a cost of Rs.10,000 each .He then sells it to Q , Q sells it to R and R sells it to S and all live in the same state.The rate of value added tax is 4% and a profit of Rs.150 at each stage of selling is allowed.Find the total amount of VAT paid. [4]

Question 6.

(a) Show that any four vertices of a regular pentagon form a cyclic quadrilateral. [3]

(b) Ramesh invested Rs.29,040 in 15% Rs 100 shares quoted at a premium of 20%.Calculate:

(i)the number of shares bought by him. [3]

(ii)his income from the investment.

(iii)the percentage return on his investment.

(c) Compute the mean of the following frequency distribution using short - cut method:

| Class interval	1 - 5	6 - 10	11 - 15	16 - 20	21 - 25
Frequency	20	50	46	22	12

[4]

Question 7.

(a) In the figure given below, ABCD is a rectangle with sides AB=42 cm and BC= 28 cm. Two quarter circles are drawn as shown in figure. **[3]** Calculate the area of the shaded part.
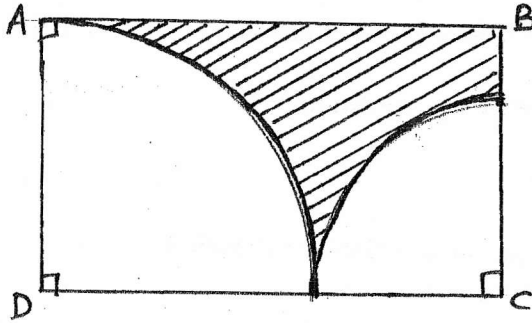
(b) A man standing on the window of the first floor of the building observes that the angle of depression of a dustbin which is 10m from the foot of the building is 45°. He climbs to the window of the second floor directly above the first floor and observes the angle of depression of the dustbin to be 60°. Calculate the height of the first floor and the second floor. **[3]**

(c) Ruler and compasses only may be used in this question. All construction lines and arcs must be clearly shown, and be of sufficient length and clarity to permit assessment.
(i) Construct triangle ABC, in which AB=9cm, BC=10cm and ABC = 45°
(ii) Draw a circle, with centre A and radius 2.5 cm and let it meet AB at D.
(iii) Construct a circle to touch the circle with centre A externally at D and also to touch the line BC. **[4]**

Question 8.

(a) How many metres of cloth, 5m wide will be require to make a conical tent, the radius of whose base is 7m and height is 24m? **[3]**

(b) Find the length of the tangent drawn to a circle of radius 4cm from a point 5cm away from the centre of the circle. **[3]**

(c) In the adjoining figure, D is a point on BC such that angleBAD is equal to angle ACB and AB=7cm,BD=5cm
(i) Prove that triangle DBA is similar to triangleABC
(ii)Find the length of BC.
(iii)Find the area of $\triangle$ABC : area of $\triangle$ADC **[4]**
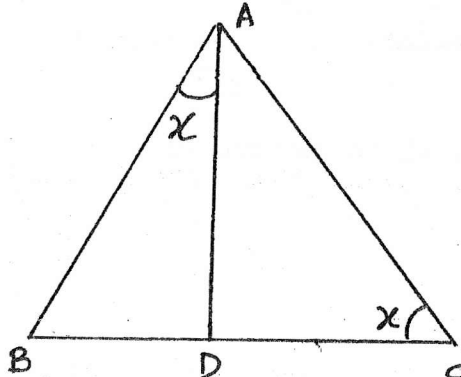
Question 9.

(a) Let A = {2, 3, 5} B = {6, 9, 10} and R = {(x, y) ∈ A X B , y > x and y is a
multiple of x.}
   (i) Write R in roster form.
   (ii) Represent R by arrow diagram.
   (iii) Is this relation a function ? Give reason foe your answer   [3]

(b) AB is a fixed line. State the locus of the pointP, so that,

$$AB^2 = AP^2 + BP^2$$ [2]

(c) Mrs.Chaturvedi has a saving bank account in Bank of Baroda.Her
passbook has the following entries:

DATE year 2006	PARTICULARS	WITHDRAWALS in Rs.	DEPOSITS in Rs.	BALANCE in Rs.
January 1	B/F	---------	---------	2200
January 8	by cash	---------	800	---------
January 13	To cheque	600	---------	---------
February10	By clearance	---------	500	---------
February 18	To cheque	300	---------	---------
September19	By cash	--------	1400	---------
November 28	To self	1000	---------	---------
December 12	By cash	-------	500	---------

She closes the account on December 20, 2006.Calculate the money she
receives on closing the account,the interest being reckoned at 4%p.a.   [5]

Question 10.

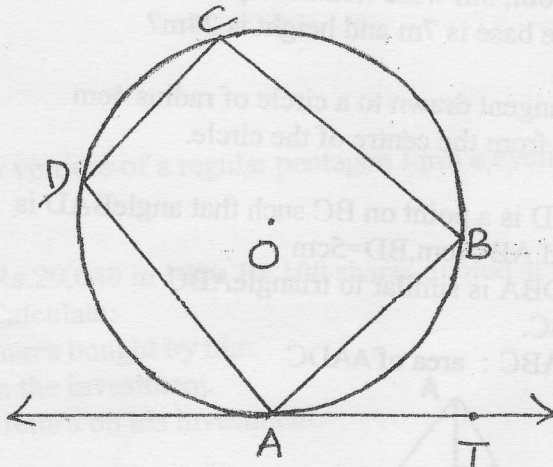(a) In the adjoining diagram,AT is the tangent to the circle with centre O.
   If angle ACD=44° and angle DAB=104°,find
   (i) angleACB
   (ii) angle AOB
   (iii) angleBAT
   (iv) angleABD   [4]

(b) The annual income statement of Mr.Mazumder for the financial
year2006-2007 is given below :
   1.Basic salary= Rs 3,50,000
   2.Dearness Allowance=Rs,70,000
   3.H.R.A=Rs 30,000
   4.Interim relief=Rs10,000
   5.Bonus=Rs 40,000

During the financial year,he invests Rs.45,000 in P.P.F and pays a quartely premium of Rs.2000 each to L.I.C.For the same year,he pays(against the housing loan)Rs.32,000 as the principal amount and Rs.25,000 as the interest on the loan.He also pays Rs.15,000 as tuition fees for his children.Calculate the tax to be paid by him at the end of the year,if Rs.42,000 is already paid as advance income tax for 11 months

1. INCOME SLAB   TAX
   Upto Rs.1,00,000   : No tax
   Rs.1,00,001 to Rs.1,50,000   :10% of income exceeding Rs.1 lakh
   Rs.1,50,001 to Rs.2,50,000   : Rs.5000+ 20% of the income
                                      exceeding Rs.1.5 lakh.

   Above Rs.2,50,000   : Rs.25,000 + 30%of the income
                                      exceeding Rs.2.5 lakh

2. Deduction on savings   : Upto Rs. 1,00,000
3. Deduction on the interest
   against housing loan   : Upto Rs.1,50,000   [6]
4. Education cess   : 2% of the income

Question 11.

(a) A cone and a cylinder are of the same height. Their radii of the bases are in the ratio of 2:1. Find the ratio of their volumes. [4]

(b) Using graph paper, draw an ogive for the following distribution which shows a record of the weight in kilograms of 200 students.

WEIGHT	FREQUENCY
40 - 45	5
45 - 50	17
50 -55	22
55 -60	45
60 - 65	51
65 - 70	31
70 - 75	20
75 - 80	9

Use the ogive to estimate the following:(i)The percentage of students weighing 55 Kg or more, (ii)the weight above which the heaviest 30% of the students fall (iii)the number of students who are (a)under-weight and (b)over-weight, if 55.70kg is considered as standard weight. [6].