

**General Instructions**

- All questions are compulsory.
- The question paper consists of 25 questions divided into three sections A, B & C. Section A contains 7 questions of 2 marks each. Section B is of 12 questions of 3 marks each & Section C is of 6 questions of 5 marks each.
- There is no overall choice. However, an internal choice has been provided in two questions of 3 mark each, two questions of 4 mark each & two questions of 6 mark each.
- Write the serial number of the question before attempting it.
- In question on construction, the drawing should be neat & exactly as per the given measurements.
- Use of calculators is not permitted. However you may ask for mathematical tables.

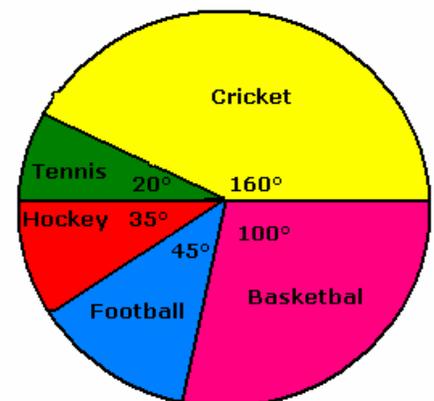
**Section A**

- Solve graphically.  
 $x - y = 10$ ,  $3x - 4y = 0$
- Find the three terms in A.P. such that their sum is 3 and product is -8.
- A mobile is available for Rs.78, 000 cash or for  $33\frac{1}{3}\%$  cash down payment and 11 equal monthly installments of Rs.4900 each. Calculate the rate of interest charged.
- A man borrowed a sum of money and returned it in 3 equal quarterly instalments of Rs.43, 940 each. Find the sum borrowed, if the rate of interest charged was 16% per annum compounded quarterly. Find also the total interest charged.
- A number is selected from 2 to 21 (both inclusive). Find the probability that the selected number is (1) a prime number, (2) an odd number, (3) a composite number
- Prove  $(1 + \cot\theta - \operatorname{cosec}\theta)(1 + \tan\theta + \sec\theta) = 2$

Or

$$\frac{\cot A + \operatorname{cosec} A - 1}{\cot A - \operatorname{cosec} A + 1} = \sin A$$

- The pie-chart represents the amount spent on different sports by a school administration in a calendar year. If the money spent on football is Rs.18000, answer the following questions:  
(a) What is the total amount spent on sports?  
(b) What the amount spent on Tennis?  
(c) How much more amount is spent on cricket than Hockey?
- In a right  $\triangle ABC$ , right angled at C,  $CD \perp AB$  where D is



a point on AB. Prove that  $\frac{1}{AC^2} + \frac{1}{BC^2} = \frac{1}{CD^2}$

9. A solid is in form of a cylinder with hemi spherical ends. The total height of cylinder is 19 cm and diameter of cylinder is 7cm. Find volume and surface area of the cylinder.
10. Water in a canal, 30 dm wide and 12 dm deep is flowing with a velocity of 10 km/h How much area will it irrigate in 2hours if 4 cm of standing water is required.

Or

The internal and external radii of a hollow sphere are 3 cm and 5cm respectively. The sphere is melted to form a solid cylinder of height  $2\frac{2}{3}$  cm. Find the diameter and curved surface area of cylinder.

### Section B

11. Students of a class are made to stand in rows. If four students are extra in a A row, there would be two rows less.If four students are less in a row, there would be 4 more rows. Find number of students in the row.

Or

The sum of two digit number and the number obtained by reversing the order of digits is 99.If the digits differ by 3, find the number.

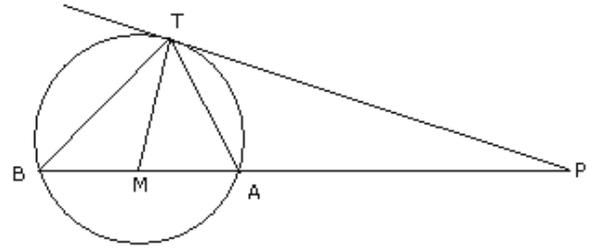
12. If  $x - 2$  is a factor of  $x^3 + ax^2 + bx + 18$  and  $a - b = 7$ . Find a and b
13. What rational expression should be added to  $\frac{x - x^2 + 2}{x(x^2 - 1)}$  to get  $\frac{x + 1}{x^2 - 1}$
14. A shopkeeper buys a number of books for Rs 80. If he had bought 4 more books for the same amount each would have cost Re1 less. How many books did he buy?

Or

A plane left 30min. later than the scheduled time and in order to reach its destination 1500 k.m. away in time it has to increase its speed by 250 km /h from its usual speed .Find its usual speed.

15. Two pipes running together fill a cistern in  $2\frac{8}{11}$  minutes. If one pipe takes 1 minute more than the other to fill the cistern, find the time in which each pipe would fill the cistern

16. In the given figure TM is bisector of  $\angle ATB$  Prove that  $PT = PM$



17. Construct a triangle ABC in which  $AB=6\text{cm}$ ,  $\angle B=95^\circ$ ,  $AC=8\text{cm}$ . Now construct a triangle similar to triangle ABC such that each of its side is three fourth of the corresponding side of triangle ABC.

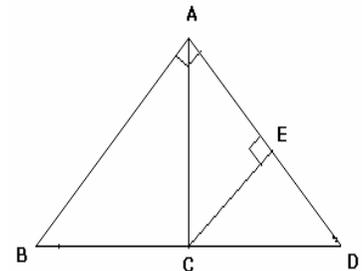
18. A sphere has a radius of 420cm. 120 hemispheres of radius 2.1cm are cut from its surface. Find percentage change in surface area.
19. Prove that quadrilateral formed by joining following points is a parallelogram (2, 1), (8, 9), (-3, 11) and (-9, 3).
20. Find the co-ordinate of the point which divides the line-segment joining the points (-7, 4) and (-6, -5) internally in the ratio 7:2.

### Section C

21. If two circles touch each other (internally or externally), the point of contact lies on the line through the centers-prove it. Use it to prove the following:  
 "If two circles  $C(O, r)$  and  $C(O', r)$  touch externally at a point A and PAQ is a line segment intersecting the circles at P and Q respectively, prove that  $\angle OPA = \angle O'QA$ ".
22. If two sides and a median bisecting the third side of a  $\Delta$  are respectively proportional to the two sides and the corresponding median of another triangle, then prove that the triangles are similar.

Or

In figure  $\Delta ABC$ ,  $\angle B = 90^\circ$ , AD is its bisector. If  $DE \perp AC$ , prove that  $DE(AB + AC) = AB \times AC$



23. An aeroplane left 30 minutes later than its scheduled time and in order to reach its destination 1500Km away in time, it increased its speed by 250 km/h from its usual speed. Find its usual speed.

Or

From the top of a tower, the angles of depression of two objects on same side of tower are found to be  $\theta$  and  $\beta$  ( $\theta > \beta$ ). If the distance between the objects

is 'p' metres, show that the height 'h' of the tower is given by  $h = \frac{p \tan \theta \tan \beta}{\tan \theta - \tan \beta}$ .

Also determine the height of tower if  $p = 50$  metre,  $\theta = 60^\circ$  and  $\beta = 30^\circ$ .

24. Find, the mean for the above data

<b>Marks</b>	<b>0-9</b>	<b>10-19</b>	<b>20-29</b>	<b>30-39</b>	<b>40-49</b>	<b>50-59</b>	<b>60-69</b>
<b>Frequency (f)</b>	<b>323</b>	<b>135</b>	<b>217</b>	<b>156</b>	<b>534</b>	<b>400</b>	<b>234</b>

25. A aged 68 years has annual income (excluding HRA) of Rs.4, 80,000. She contributes Rs.1500 per month in her provident fund and pays Rs.8,500 as premium for an insurance policy twice a year. She buys NSC worth Rs.5,000. She buys infrastructure bonds worth Rs.50, 000. Find tax payable at end of year if her employer deducted Rs.2000 as income tax per month for first 11 months at source.

**TAX RATES FOR SENIOR CITIZEN ASSESSEE**

<b>Taxable Income</b>	<b>Rate of Tax</b>	<b>Surcharge</b>	<b>Educational cess</b>
<b>Up to Rs.1,85,000</b>	<b>Nil</b>	<b>Nil</b>	<b>Nil</b>
<b>Rs.1,85,001 to Rs. 2,50,000</b>	<b>20% of total Income exceeding Rs.1,85,000</b>	<b>Nil</b>	<b>2 % of income tax</b>
<b>Rs.2,50,001 to Rs.10,00,000</b>	<b>Rs.13,000 + 30% of total income exceedingRs.2,50,000</b>	<b>Nil</b>	<b>2% of income tax</b>
<b>Above Rs.10,00,000</b>	<b>Rs.2,38,000 + 30% of total income exceedingRs.10,00,000</b>	<b>10% of income tax</b>	<b>2% of income tax and surcharge</b>

**Maximum Savings allowed :**

**Rs.1,00,000**

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or

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