

Class X  
Sample paper  
(Based on latest sample papers issued by C.B.S.E.)

Max Marks 100

Time 3hours

General Instructions:

1. All questions are compulsory.
2. The question paper consists of 25 questions divided into three sections A; B & C. Section A contains 10 questions of 3 marks each. Section B is of 10 questions of 4 marks each & Section C is of 5 questions of 6 marks each.
3. Write the serial number of the question before attempting it.
4. In question on construction, the drawing should be neat & exactly as per the given measurements.
5. Use of calculators is not permitted. However you may ask for mathematical tables.

1. Solve  $65x - 33y = 97$ ,  $33x - 65y = 1$

2. Simplify  $\frac{1}{1-x+x^2} - \frac{1}{1+x+x^2} - \frac{2x}{1+x^2+x^4}$

3. Prove any four vertices of a regular pentagon are concyclic.

4. An article is available for Rs 14,000 cash or for Rs 3700 cash down payment followed by four monthly instalments of Rs 2600 each. Calculate the rate of interest charged.

5. A sum of Rs 38255 is to be paid back in 3 equal quarterly instalments. If rate of interest charged is 8% p.a. compounded quarterly, find value of each instalment.

6. If  $(x+1)(x-4)$  is the HCF of the polynomials  $(x-4)(2x^2+x-a)$  and  $(x+1)(2x^2+bx-12)$ , find a and b.

7. Find p for real roots  $3x^2 + px - 2 = 0$

8. Find the three terms in A.P. such that their sum is 3 and product is  $-8$

9. Find the common difference of an A.P. whose first term is 100 and sum of whose first 6 terms is five times the sum of next 6 terms

10. Prove non parallel sides of a cyclic trapezium are equal.

11. A farmer wishes to grow a  $100\text{m}^2$  rectangular vegetable garden. Since he has with him only 30m barbed wire, he fences three sides of the rectangular garden letting compounded wall of his house act as the fourth side fence. Find the dimensions of his garden.

12. Solve graphically  $x - y = 10$ ,  $2x - 3y = -20$

13. Construct a  $\triangle ABC$  in which  $BC = 5\text{cm}$ ,  $\angle A = 60^\circ$ , and median AD through A is 4cm. Construct a  $\triangle A'BC'$  similar to  $\triangle ABC$  with  $BC' = 7\text{cm}$ .

14. What length of a solid cylinder of diameter 2cm must be taken to recast into a hollow

cylinder of external diameter 20cm, 0.25 cm thickness and length 15 cm.

15. Prove  $\left(1 + \frac{1}{\tan^2 A}\right)\left(1 + \frac{1}{\cot^2 A}\right) = \frac{1}{\sin^2 A - \sin^4 A}$

16. Show that the points (2, -2), (8,4), (5,7) and (-1,1) are vertices of a rectangle.

17. Find the ratio in which line segment joining (-2,-3) and (1,6) is divided by x axis.

18. Draw a pie chart

|           |        |           |       |            |        |
|-----------|--------|-----------|-------|------------|--------|
| Education | Health | Transport | Power | Industries | Others |
| 30%       | 20%    | 10%       | 15%   | 15%        | 10%    |

19. A card is drawn from a well shuffled deck of 52 cards. Find the probability of getting a non face card.

20. Find mean by step deviation method

|                |      |       |       |       |       |       |
|----------------|------|-------|-------|-------|-------|-------|
| Class Interval | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
| Frequency      | 235  | 340   | 340   | 360   | 420   | 220   |

21. Prove opposite angles of a cyclic quadrilateral are supplementary. Using it prove exterior angle of a cyclic quadrilateral is equal to interior opposite angle.

22. In an equilateral  $\Delta ABC$ , D is a point on BC such that  $3BD = BC$ . Prove  $9AD^2 = 7AB^2$

23. The angle of elevation of a cliff from a fixed point is  $\theta$ . After going up a distance of k metres towards the top of the cliff at an angle of  $\phi$ , it is found that angle of elevation is  $\alpha$ . Show that the height of the cliff is

$$\frac{k(\cos \phi - \sin \phi \cos \alpha)}{\cot \theta - \cot \alpha} \text{ metres.}$$

24. 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 30 minutes, if 4 cm of standing water is required for irrigation?

25. Aastha aged 70 years has an annual income of Rs 4,00,000. She deposits Rs3,000 per month in her P.F. account and pays a premium of Rs5,000 to L.I.C. quarterly. She buys N.S.C worth Rs 50,000. She donates Rs 10,000 to N.D.F. If Rs 3000 are deducted every month from her salary as income tax, for the first 11 months of the year, Find tax Payable at the end of the year.

- (a) Standard deduction: (1) 40% of the total income subject to a maximum of Rs.30,000 in case the annual salary is up to Rs. 1,00,000.  
 (2) Rs. 30,000 in case the total income from Rs 1,00,001 to Rs. 5,00,000.

(b) Rates of income tax:

- (1) Up to Rs.50, 000: No tax  
 (2) From Rs. 50,001 to 60,000: 10% of the amount exceeding Rs. 50,000  
 (3) From Rs. 60,001 to 1,50,000: Rs. 1000 + 20% of the amount exceeding Rs. 60,000  
 (4) Above Rs. 1,50,000: Rs. 19000 + 30% of the amount exceeding Rs. 1,50,000.

(c) Rebate in income tax:

- (1) 20% of the amount of the saving subject to max. Rs. 20,000 if taxable income is up to Rs.1,50,000\*
- (2) 15% of the amount of saving subject to max. Rs.15,000 if taxable income is between Rs.1,50,001 to 5,00,000\*
- (3) NIL, if taxable income is above Rs. 5,00,000.  
\*if at least Rs.30,000 are invested in specified infrastructure bonds.

(d) Surcharge: 10% of tax payable, if taxable income is above Rs. 8,50,000.

(e) Rebate in tax for women  
whichever is less Rs.5,000 or 100% of total tax payable

(f) Rebate for senior citizens  
whichever is less. Rs.20,000 or 100% of total tax payable  
(Aged 65 years or above)