DESIGN OF THE SAMPLE QUESTION PAPERS
MATHEMATICS-CLASS X

Time : 3 Hours **Max. Mark : 100**

The weightage or the distribution of marks over different dimensions of the question paper shall be as follows :

1. Weightage to Learning Outcomes

S. No.	Learning Outcomes	Marks
1.	Knowledge	31
2.	Understanding	45
3.	Application	12
4.	Skill	12

2. Weightage to content/subject Unit

S. No.	Learning Outcomes	Marks
1.	Algebra	26
2.	Commerical Mathematics	12
3.	Mensuration	10
4.	Trigonometry	10
5.	Geometry	22
6.	Statistics	12
7.	Coordinate Geometry	8

Total : 100

3. Weightage to form of questions

S. No.	Form of Question	Marks for each question	Number of questions	Total Marks
1.	SA I	3	10	30
2.	SA II	4	10	40
3.	LA	6	05	30

4. The expected length of answer under different forms of questions and expected time would be as follows :

S. No.	Form of Questions	No. of credit points	Approx. Time
1.	Short answer type (SA I)	Upto 4 Credit Points	3-5 minutes
2.	Short answer type (SA II)	Upto 6 Credit Points	5-7 minutes
3.	Long answer type (LA)	Upto 8 Credit Points	8-10 minutes

Q4. A suit is available for Rs. 1500 cash or for Rs. 500 cash down payment followed by 3 monthly instalments of Rs. 345 each. Find the rate of interest charged under the instalment scheme.

Q5. A loan has to be returned in two equal annual instalments. If the rate of interest is 16% per annum compounded annually and each instalment is of Rs. 1682, find the sum borrowed and the total interest paid.

Q6. If (x — 2) is a factor of $x^2 + ax + b$ and a + b = 1, find the values of a and b.

Q7. Using quadratic formula, solve the following equation for x :

$abx^2 + (b^2 - ac)\, x - bc = 0$

OR

The sum of the squares of two positive integers is 208. If the square of the larger number is 18 times the smaller, find the numbers.

Q8. Which term of the A.P. 3, 15, 27, 39.... is 132 more than its 54th term ?

OR

Derive the formula for the sum of first n terms of an A.P. whose first term is 'a' and the common difference is 'd'

Q9. Find the sum of the following arithmetic progression:

1+3+5+7+.....+199

Q10. Show that a line drawn parallel to the parallel sides of a trapezium divides the non non-parallel sides proportionally.

SECTION B

Q11. Solve for x, $\frac{1}{x+1} + \frac{2}{x+2} = \frac{4}{x+4}$, (x/= -1, -2, -4)

Q12. Find graphically, the vertices of the triangle formed by the x-axes and the lines

2x — y + 8 = 0

8x + 3y — 24 = 0

Q13. Construct a triangle ABC in which BC = 13cm, CA = 5cm and AB = 12cm. Draw its incircle and measure its radius.

Q14. The total surface area of a closed right circular cylinder is 6512 cm^2, and the circumference of its base is 88 cm. Find the volume of the cylinder (use $\pi = \frac{22}{7}$)

Q15. Prove the identity :

$(1 + \text{Cot}\theta - \text{Cosec}\theta)(1 + \tan\theta + \sec\theta) = 2.$

Q8. The rain water from a roof 22m x 20m drains into a conical vessel having diameter of base as 2m and height 3.5m. If the vessel is just full, find the rainfall (in cm.)

OR

The largest sptere is carved out of a cube of side 7cm ; find the volume of the sphere.

Q9. The following table shows the marks secured by 100 students in an examination

Marks	0-10	10-20	20-30	30-40	40-50
Number	15	20	35	20	10

Find the mean marks obtained by a student.

Q10. A dice is thrown once. Find the probability of getting.

(i) a number greater than 3

(ii) a number less than 5

OR

A bag contains 5 red balls, 8 white balls, 4 green balls and 7 black balls. A ball is drawn at random from the bag. Find the probability that it is

(i) black

(ii) not green

SECTION B

Q11. Solve for x and y

$(a-b)x + (a+b)y = a^2 - 2ab - b^2$

$(a+b)(x+y) = a^2 + b^2$

Q12. If $(x+3)(x-2)$ is the G.C.D. of

$f(x) = (x+3)(2x^2-3x+a)$

and $g(x) = (x-2)(3x^2 + 10x-b)$

find the value of a and b

Q13. If $A = \frac{2x+1}{2x-1}$, $B = \frac{2x-1}{2x+1}$, find

$$\frac{A+B}{A-B} + \frac{A-B}{A+B}$$

Q14. Solve for x :

$$\frac{x-1}{x-2} + \frac{x-3}{x-4} = \frac{10}{3} \quad (x \neq 2, x \neq 4)$$

Q15. A passenger train takes 2 hours less for a journey of 300 km if its speed is increased by 5 km/h from its usual speed. Find the usual speed of the train.

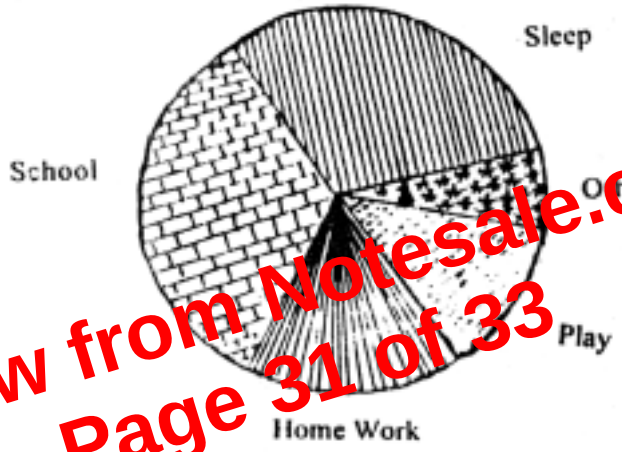
Q. No.	Value Points	Marks

SECTION C

Q21. Making the table:

Correct Central angles 2

Activity	Duration in hours	Central angle
Sleep	7	105^0
School	8	120^0
Home work	4	60^0
Play	3	45^0
Others	2	30^0



Drawing correct Pie chart with markings 4

Q22. figure 1

Writing the trignometric equation

$\frac{b}{x} = \tan\alpha \Rightarrow x = b\cot\alpha$ 1 ½

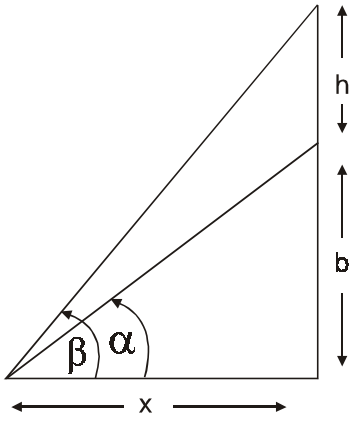
Again $\frac{b+h}{x} = \tan\beta \Rightarrow \frac{b+h}{b\cot\alpha} = \tan\beta$ 1

$\Rightarrow (b+h) = \frac{b\tan\beta}{\tan\alpha}$ 1

$\Rightarrow b\tan\alpha + h\tan\alpha = b\tan\beta$

$\Rightarrow h\tan\alpha = b(\tan\beta - \tan\alpha)$ 1

$\Rightarrow b = \frac{h\tan\alpha}{\tan\beta - \tan\alpha}$ ½



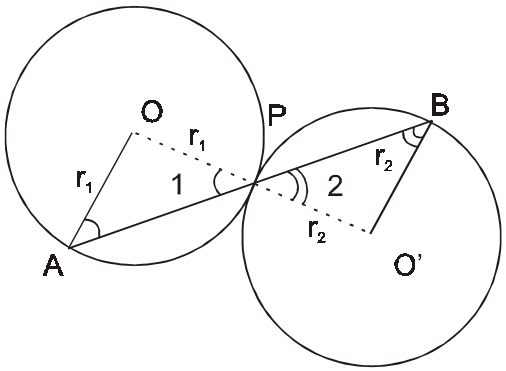
Q. No.	Value Points	Marks

OR

Given ,to prove construction & correct figure — 1/2 x 4 = 2

Correct proof — 2

Figure — ½



OPO' is a straight line

Since OA = OP = r_1 ∴ ∠A = ∠∠1, Similarly ∠B = ∠2 — ½

But ∠1 = ∠2 (vert. Opp. ∠s) ∴ A = ∠B — ½

But these are alternate angles ∴ OA||O' B — ½

Q25. Taxable income = Rs. 145000 − 30,000 = Rs. 1,15,000 — ½

Income tax = Rs. $\left[1000 + \frac{55000 \times 20}{100}\right]$ = Rs. 12,000 — 1

Annual savings = Rs [2000 x 12 + 15000] = Rs. 39,000 — 1

Rebate = 20% of Rs. 39000 = Rs. 7800 — 1

∴ Tax = Rs. (12000 — 7800) = Rs. 4200 — 1

Income tax paid for first 11 months = Rs. (250 x 11) = Rs. 2750 — 1

∴ Income tax to be paid in the last month = Rs. (4200— 2750) = Rs. 1450 — ½