AP SUPER GURU MODEL TEST PAPER – 1

MATHEMATICS (UNSOLVED)

Time Allowed : 3 Hours | CLASS – X | Maximum Marks : 80

Note

1. All questions are compulsory.
2. Part 'A' has 1 to 3 Questions.
   (*i*) Que. No. 1 consists of 16 Multiple Choice Questions carrying 1 mark each.
   (*ii*) Que. No. 2 consists of 7 True/False type questions carrying 1 mark each.
   (*iii*) Que. No. 3 consists of 7 Fill in the blanks type questions with options carrying 1 mark each.
3. Part 'B' contains question No. 4 to 7 of 2 marks each.
4. Part 'C' contains question no. 8 to 13 of 4 marks each. Any three questions of these questions have internal choice. Question 12 or part will be of case study.
5. Part 'D' contains Questions no. 14 to 16 each of 6 marks. All these questions have internal choice.

PART – A

Each questions is of 1 mark in this part : $(16 \times 1 = 16)$

1. Choose the right option from the following questions :

(*i*) $5 + \sqrt{2}$ is a/an ..... number.

(*a*) rational (*b*) irrational (*c*) natural (*d*) whole

(*ii*) HA real number k, is a zero of the polynomial P(*x*) if ....

(*a*) P(k) = 0 (*b*) P(k) < 0 (*c*) P(k) > 0 (*d*) None of these

(*iii*) The zeroes of a polynomial f(x) are the coordinates of the points. where the graph of y = f(*x*) intersects the ..... .

(*a*) x-axis (*b*) *y*-axis (*c*) (*x*, *y*) (*d*) origin

(*iv*) Which value of k, does the pair of lines $3x - 3y = 6$ and $kx - 9y = 18$ are coincident ?

(*a*) 2 (*b*) 3 (*c*) 9 (*d*) 6

(*v*) Which of the following is not a quadratic equation ?

(*a*) $x - \frac{3}{x} = 4$ (*b*) $3x - \frac{5}{x} = x^2$ (*c*) $x + \frac{1}{x} = 4$ (*d*) $x^2 - 3 = 4x^2 - 4x$

(*vi*) Which is the common difference of an A.P. whose nth term is a_n = ...

(*a*) $a_{n+1} + a_n$ (*b*) $a_n = a + (n-1)d$ (*c*) $a_n = S_{n+1} - S_n$ (*d*) $d = a_{n+1} - a_n$

(*vii*) All equilateral triangles are ..... .

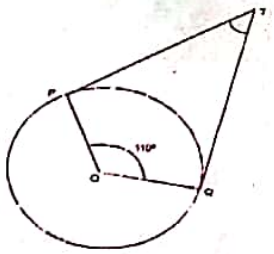
(*a*) congruent (*b*) similar (*c*) equal (*d*) consistent

(*viii*) $1 - \cos^2 \theta =$

(*a*) $\sec^2 \theta$ (*b*) $\sin^2 \theta$ (*c*) $\tan^2 \theta$ (*d*) $\text{cosec}^2 \theta$

(*ix*) If TQ and TP are the two tangents to a circle with centre O so that $\angle POQ = 110°$ then $\angle PTQ$ is equal to

(*a*) 60° (*b*) 70° (*c*) 80° (*d*) 90°



(*x*) If in a triangle ABC, angle B is right angle, then what will be the value of $\sin\left(\frac{A+C}{2}\right)$?

(*a*) 1 (*b*) $\frac{1}{2}$ (*c*) $\frac{\sqrt{3}}{2}$ (*d*) $\frac{1}{\sqrt{2}}$

(*xi*) If the perimeter and the area of a circle are numerically equal, then the radius of the circle is

(*a*) 2 units (*b*) π units (*c*) 4 units (*d*) 7 units

(*xii*) The curved surface area of the cone = ...

(*a*) $\pi(r_1+r_2)l$ (*b*) $\pi(r_1+r_2)h$ (*c*) $2\pi(r_1+r_2)l$ (*d*) πrl

(*xiii*) The volume of the solid formed by joining two basic solids will actually be the ..... of the volumes of the constituents.

(*a*) sum (*b*) difference (*c*) product (*d*) division

(*xiv*) Which of the following formula is used to find the mode ?

(*a*) $l+\left(\frac{\frac{n}{2}-cf}{f}\right)\times h$ (*b*) $a+\frac{\Sigma f_i d_i}{\Sigma f_i}$

(*c*) $a+\left(\frac{\Sigma f_i u_i}{\Sigma f_i}\right)\times h$ (*d*) $l+\left(\frac{f_1-f_0}{2f_1-f_0-f_2}\right)\times h$

(*xv*) One card is drawn from a well shuffled deck of 52 cards. Calculate the probability that the card will be queen diamonds.

(*a*) $\frac{5}{26}$ (*b*) $\frac{4}{13}$ (*c*) $\frac{3}{13}$ (*d*) $\frac{1}{52}$

(*xvi*) Which of the following number cannot be the probability of an event ?

(*a*) $\frac{3}{4}$ (*b*) -1.5 (*c*) 15% (*d*) 0.7

2. True/False : $7 \times 1 = 7$

(*i*) Every composite number can be factoriese as product of primes. (True/False)

(*ii*) Point (2, 0) lies on *x*-axis. (True/False)

(*iii*) cos A is the abbreviation used for the cosecant of angle A (True/False)

(*iv*) The opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle. (True/False)

(*v*) The Quadratic formula of the quadratic equation = $b^2 - 4ac$. (True/False)

(*vi*) If a pair of linear equation of two variables is consistent then the lines, representing the equations will be intersecting or coincident. (True/False)

(*vii*) 3 Median = Mode + 2 Mean. (True/False)

3. Fill in the blanks. $7 \times 1 = 7$

(*i*) If $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} = \frac{c_1}{c_2}$ then the pair of linear equations has ..... solution.

(*ii*) If a, b and are consecutive three terms in A.P. then b = ...

(*iii*) In the figure given below DE || BC, then the value of AD = ...

(*iv*) The distance of poin (x, y) from origin is ..... .

(*v*) The Circumference of a circle = ...

(*vi*) The volume of a cylinder = ...

(*vii*) Probability of an even E + Probability of an event 'not E' is equal to ..... .

PART–B

Note : This part has question of 2-2 marks. $(4 \times 2 = 8)$

4. Find the HCF of 96 and 404 by Prime Factorisation Method.
5. Find the zeroes of the quadratic polynomial $t^2 - 15$.
6. A horse is tied to a peg at one corner of a square shaped grass field of side 15m by means of a 5m long rope. Find the area of that part of field in which the horse cannot graze.
7. 12 defective pens are accidentally mixed with 132 good pens. It is not possible to just look at a pen tell whether it is defective or not. One pen is taken out at random from this lot

PART–C

Note : This part has questions of 4-4 marks : $(6 \times 4 = 24)$

8. Find the two consecutive positie integers, sum of whose squares is 365.

Or

The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm. find the other two sides.

9. Find the sum of first 22 terms of an A.P. in which d = 7 and 22^{nd} term is 149.
10. Find the ratio in wich the line segment joining the points (–3, 10) and (6, –8) is dividided by (–1, 6).
11. If $\sin A = \frac{3}{5}$, then find the value of cos A and tan A.

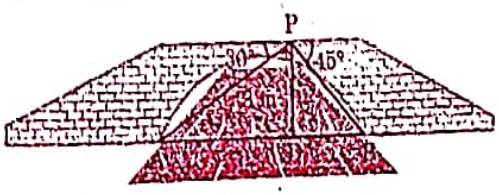
Or

Prove that $\frac{\cos A}{1+\sin A} + \frac{1+\sin A}{\cos A} = 2 \sec A$.

12. A tower stands vertically on the ground. From a point on the ground, which is 15 m away from the foot of the tower. the angle of elevation of the top of the tower is found to be 60°. Find the height of the tower.

Or

From a point on a bridge across a river, the angles of depressioin of the banks on opposite sides of the river are 30° and 45°, respectively. If the bridge is at a height of 3 m from the bank, find the width of the river.



13. A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. Find the total surface area of the toy.

PART–D

Note : This part has questions of 6-6 marks : **(3 × 6 = 18)**

14. Draw the graph of the equations $x - y - 4 + 1 = 0$ and $3x - 2y + 12 = 0$. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis, and shade the triangular region.

Or

The coach of a cricket team buys 7 bats and 6 balls for ₹ 3,800. Later, she buys 3 bats and 5 balls for ₹ 1,750. Find the cost of each bat and each ball.

15. Prove that, if a line is drawn parallel to one of a side of a triangle to intersect the other two sides on distinct points, then the other two sides are divided in the same ratio.

Or

Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.

16. The following data gives the distribution of total monthly household exenditure of 200 families of a village. Find the modal monthly expenditure of the families :

Expenditure (in ₹)	1000-1500	1500-2000	2000-2500	2500-3000	3000-3500	3500-4000	4000-4500	4500-5000
Number of families	24	40	33	28	30	22	16	7

Or

The distribution below gives the weights of 30 students of a class. Find the median weight of the students.

Weight (in kg)	40-45	45-50	50-55	55-60	60-65	65-70	70-75
Number of students	2	3	8	6	6	3	2

Answers of Multiple Choice Questions

1. (*i*) (*b*), (*ii*) (*a*), (*iii*) (*a*), (*iv*) (*c*), (*v*) (*b*), (*vi*) (*d*), (*vii*) (*b*), (*viii*) (*b*), (*ix*) (*b*), (*x*) (*d*), (*xi*) (*a*), (*xii*) (*d*), (*xiii*) (*a*), (*xiv*) (*d*), (*xv*) (*d*), (*xvi*) (*b*)

2. (*i*) True, (*ii*) True, (*iii*) False, (*iv*) True, (*v*) False, (*vi*) True, (*vii*) True

3. (*i*) Unique, (*ii*) $\frac{a+c}{2}$, (*iii*) 2, (*iv*) $x^2 + y^2$, (*v*) π, (*vi*) $\pi r^2 h$, (*vii*) 1.