ST. ARNOLD'S CENTRAL SCHOOL , PUNE
PRE- BOARD EXAMINATION - 1 (2017 – 18)
SUBJECT : MATHEMATICS

STD : X M.M : 80

General Instructions:

(i) All questions are compulsory.
(ii) The question paper consists of 30 questions divided into four sections A, B, Cand D.
(iii)Section A contains 6 questions of 1mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each.Section D contains 8 questions of 4 marks each.
(iv)There is no overall choice. However, an internal choice has been provided in four questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
(v) Use of calculators is not permitted.

SECTION – A

Question numbers 1 to 6 carry 1 mark each

1. Write the decimal expansion of $\frac{141}{120}$ without performing long division. (1)
2. If P($\frac{a}{3}$,4) is the mid point of the line segment joining the point Q(-6,5) and R(-2,3), then find the value of 'a'. (1)
3. The areas of two similar triangles are 169 cm^2 and 121 cm^2, if the longest side of the larger triangle is 26 cm, then find the longest side of the other triangle. (1)
4. If sec A + tan A = 7 , then find sec A – tan A. (1)
5. If mode of a data is 45 and mean is 27, then using emperical relationship estimate the value of its median. (1)
6. A bag contains 3 red balls, 5 white balls and 7 black balls. What is the probability that a ball drawn at random from the bag will be neither red nor black ? (1)

SECTION – B

Question numbers 7 to 12 carry 2 marks each

7. Show that every positive even integer is of the form 2q and every positive odd integer is of the form 2q + 1 , where q is some integer. (2)
8. Determine the 2^{nd} term of an A.P whose 6^{th} term is 12 and 8^{th} term is 22. (2)
9. Find the value of 'k' for which the point (8,1), (k,-4), (2,-5) are collinear. (2)

10. Prove that the tangents drawn at the end points of a chord of a circle make equal angles with the chord. (2)

11. Find the mode of the given distribution : (2)

Class interval	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
Frequency	2	12	22	8	6

12. In an equilateral triangle ABC, AD is drawn perpendicular to BC . Prove that: $AD^2 = 3BD^2$. (2)

SECTION – C

Question numbers 13 to 22 carry 3 marks each

13. There are 156, 208, and 260 students in groups A, B and C respectively. Buses are to be hired to take them for a field trip. Find the minimum number of buses to be hired if the same number of students should be accommodated in each bus. (3)

14. If α and β are the zeroes of the polynomial $p(x) = x^2 - 5x + 6$, find a quadratic polynomial whose zeroes are $\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$ (3)

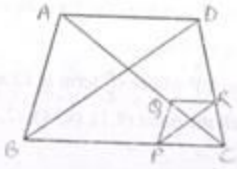
15. Solve : $\frac{11}{v} - \frac{7}{u} = 1$, $\frac{9}{v} - \frac{4}{u} = 6$ (3)

16. The base BC of an equilateral triangle ABC lies on y-axis. The coordinates of the point C are (0,-3). If origin is the mid point of BC, then find the coordinates of points A and B. (3)

OR

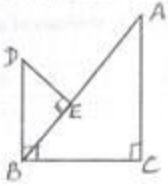
If the points (10,5), (8,4), (6,6) are the mid points of the sides of a triangle, find its vertices.

17. In the given figure, two triangles ABC and DBC lie on the same side of BC such that PQ ∥ BA and PR ∥ BD. Prove that QR ∥ AD. (3)



OR

In the figure DB $\perp$ BC , DE $\perp$ AB and AC $\perp$ BC. Prove that $\frac{BE}{DE} = \frac{AC}{BC}$.



18. Construct a triangle ABC, in which base BC = 6 cm, $\angle B = 60^\circ$ and $\angle BAC = 90^\circ$. Construct another triangle whose sides are $\frac{3}{5}$ times the corresponding sides of the given triangle. (3)

19. If $\sin(A+B) = \sin A\cos B + \cos A\sin B$, then find the value of $\sin 75^\circ$. (3)

OR

In an acute angled triangle ABC, if $\sin 2(A+B-C) = 1$ and $\tan(B+C-A) = \sqrt{3}$, find the values of A,B and C.

20. A calf is tied with a rope of length 6 m at the corner of a square grassy lawn of side 20 m. If the length of the rope is increased by 5.5 m, find the increase in area of the grassy lawn in which the calf can graze. (3)

OR

The area of an equilateral triangle ABC is 17320.5 cm^2. With each vertex of the triangle as centre, a circle is drawn with radius equal to half the length of the side of the triangle. Find the area of the shaded region. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73205$)

21. A bucket is in the form of a frustum of a cone. Its depth is 16 cm and the diameters of the top and bottom are 40 cm and 16 cm respectively. Find the cost of the bucket if the cost of the metal sheet used is Rs 20 per 100 cm^2. (3)

22. A bag contains tickets, numbered 11,12,13……,30. A ticket is taken out from the bag at random. Find the probability that the number on the drawn ticket is :

(i) a multiple of 7

(ii) greater than 15 and a multiple of 5. (3)

SECTION – D

Question numbers 23 to 30 carry 4 marks each

23. During the medical checkup of 35 students of a class, their weights were recorded as follows :

Weight (kg)	38 - 40	40 - 42	42 - 44	44 - 46	46 - 48	48 - 50	50 – 52
No. of students	3	2	4	5	14	4	3

Draw a 'less than type' ogive from the given data. Also obtain the median weight from the graph. (4)

OR

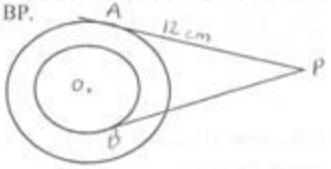
Find the median of the following frequency distribution :

Class interval	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
frequency	4	4	7	10	12	8	5

24. A man has a hemispherical bowl of diameter 36 cm full of milk. He decided to fill this milk into cylindrical bottles each of radius 3 cm and height 6 cm and donate it to poor children. How many bottles was he able to donate ? By feeding the poor children what value does the man depict ? (4)

25. The angle of elevation of an aeroplane from a point on the ground is 60° . After a flight of 15 seconds, the angle of elevation changes to 30° .If the aeroplane is flying at a constant height of $1500\sqrt{3}$ m, find the speed of the aeroplane. (4)

26. In the given figure, there are two concentric circles with centre O and radii 5 cm and 3 cm. From an external point P, tangents PA and PB are drawn to these circles. If AP = 12 cm. Find the length BP. (4)



OR

Prove that the lengths of the tangents drawn from an external point to a circle are equal.Using the above, find the length AQ from the figure, if AB and APQ are tangents to the inner circle from a point A on the outer circle. AB = 7.5 cm.