



# THE H.B.KAPADIA NEW HIGH SCHOOL

ENGLISH MEDIUM

FIRST PRELIMINARY EXAMINATION, JANUARY-2015



An ISO 9001 : 2008 Certified Institution

Standard : X

Marks : 100

Subject : Maths (12)

Duration : 3 hours (A+B)

**CHOOSE THE CORRECT OPTION FROM THOSE GIVEN BELOW :**

- If  $T_3 = 8$ ,  $T_7 = 24$ , then  $T_{10} = \dots\dots\dots$   
 (a) -4 (b) 28 (c) 32 (d) 36
- If  $S_n = 2n^2 + 3n$ , then  $d = \dots\dots\dots$   
 (a) 13 (b) 4 (c) 9 (d) -2
- If the sum of the three consecutive terms of A.P. is 48 and the product of the first and the last is 252, then  $d = \dots\dots\dots$   
 (a) 2 (b) 3 (c) 4 (d) 16
- The probability of certain event is  $\dots\dots\dots$   
 (a) 0 (b) 10 (c) 0.5 (d) 1
- In  $\triangle ABC$ ,  $A-M-B$  and  $A-N-C$  and  $\overline{MN} \parallel \overline{BC}$ ,  $AB = 5.4$ ,  $AC = 6.3$  and  $AM = 1.8$ , then  $NC = \dots\dots\dots$   
 (a) 1.8 (b) 2.1 (c) 3.6 (d) 4.2
- In  $\triangle PQR$ ,  $m\angle Q = 90^\circ$ .  $\overline{PQ} \cong \overline{QR}$ . Then  $PQ:PR = \dots\dots\dots$   
 (a) 1 : 1 (b) 1 : 2 (c)  $\sqrt{2} : 1$  (d) 1 :  $\sqrt{2}$
- For  $\triangle MNP$ ,  $MN^2 + MP^2 = 50$ . If median  $\overline{MX}$  has length 3, then  $NP = \dots\dots\dots$   
 (a) 4 (b) 32 (c) 8 (d) 16
- The foot of perpendicular from  $P (-3,2)$  to Y-axis is M. Coordinates of M are  $\dots\dots\dots$   
 (a) (3,0) (b) (0,2) (c) (2, 0) (d) (-3,2)
- The coordinates of the foot of perpendicular from  $P (5,-1)$  to X-axis are  $\dots\dots\dots$   
 (a) (5,1) (b) (-3,2) (c) (0,0) (d) (5,0)
- For the points A (4, -7) and B (-1,5),  $AB = \dots\dots\dots$   
 (a) 5 (b) 12 (c) 13 (d)  $\sqrt{13}$
- If  $a = 2$  and  $d = 4$ , then  $S_{20} = \dots\dots\dots$   
 (a) 600 (b) 800 (c) 78 (d) 80
- For the equation  $ax^2 + bx + c = 0$  to be a quadratic equation, the necessary condition is  $\dots\dots\dots$   
 (a)  $a = 0$  (b)  $a \neq 0$  (c)  $a \neq 1$  (d)  $a = 1$
- The correspondence  $ABC \leftrightarrow XYZ$  is a similarity in  $\triangle ABC$  and  $\triangle XYZ$ .  $ABC = 72$ ,  $BC = 6$ .  $YZ = 10$ . Then  $XYZ = \dots\dots\dots$   
 (a) 280 (b) 260 (c) 200 (d) 290

14. In  $\triangle XYZ$ ,  $m\angle X : m\angle Y : m\angle Z = 1:2:3$ . If  $XY = 15$ ,  $YZ = \dots\dots\dots$   
 (a) 5 (b) 17 (c) 8 (d) 7.5
15.  $\dots\dots\dots = 1$   
 (a)  $\cot^2 \theta - \operatorname{cosec}^2 \theta$  (b)  $\operatorname{cosec}^2 \theta - \cot^2 \theta$  (c)  $\operatorname{cosec}^2 \theta + \cot^2 \theta$  (d)  $\tan^2 \theta - \sec^2 \theta$
16. If  $\sin \theta = \frac{5}{13}$  then  $\cot \theta = \dots\dots\dots$   
 (a)  $\frac{5}{12}$  (b)  $\frac{12}{5}$  (c)  $\frac{12}{13}$  (d)  $\frac{13}{12}$
17. If the angle of elevation of the top of the tower at a distance 400 m from its foot has measure  $30^\circ$ , then the height of the tower is  $\dots\dots\dots$   
 (a)  $200\sqrt{2}$  (b)  $\frac{400}{\sqrt{3}}$  (c)  $200\sqrt{3}$  (d)  $\frac{400}{\sqrt{2}}$
18. A tower is  $50\sqrt{3}$  m high. The angle of elevation of its top from a point 50 m away from its foot has measuring  $\dots\dots\dots$   
 (a)  $45^\circ$  (b)  $60^\circ$  (c)  $30^\circ$  (d)  $15^\circ$
19. The ratio of the radii of two cones having equal height is  $2 : 3$ . Then, the ratio of the volume is  $\dots\dots\dots$   
 (a)  $4 : 6$  (b)  $8 : 27$  (c)  $3 : 2$  (d)  $4 : 9$
20. The radii of frustum of a cone are 5 cm and 9 cm and height is 6 cm, then the volume is  $\dots\dots\dots \text{cm}^3$ .  
 (a)  $320\pi$  (b)  $151\pi$  (c)  $302\pi$  (d)  $98\pi$
21. Product of three consecutive integers is divisible by  $\dots\dots\dots$   
 (a) 24 (b) 8 but not by 24 (c) 6 (d) 20
22. If  $n > 1, n^4 + 4$  is  $\dots\dots\dots (n \in \mathbb{N})$ .  
 (a) A prime (b) a composite integer  
 (c) 1 (d) infinite
23. To eliminate  $x$ , from  $3x + y = 7$  and  $-x + 2y = 2$  second equation is multiplied by  $\dots\dots\dots$   
 (a) 1 (b) 2 (c) 3 (d) -1
24.  $\frac{x}{2} = \frac{6}{y} = 2$  then  $x - y = \dots\dots\dots$   
 (a) 1 (b) 0 (c) -1 (d) 4
25. A two-digit number, the digit at units place is  $x$  and the digit at tens place is 3. Then, number is  $\dots\dots\dots$   
 (a)  $10x + 3$  (b)  $x + 3$  (c)  $x + 30$  (d)  $3x$
26. The cost of two tables and a chair is Rs 2100. while the cost of two chairs and a table is Rs 1800. Then, the cost of a table and a chair is  $\dots\dots\dots$   
 (a) Rs 3900 (b) Rs 1300 (c) Rs 5200 (d) 6900
27. If  $x = 2$  is a root of the equation  $x^2 - 4x + a = 0$ , then  $a = \dots\dots\dots$   
 (a) -2 (b) 2 (c) -4 (d) 4

28. The quadratic equation.....has 3 as one of its roots.  
(a)  $x^2 - x - 6 = 0$  (b)  $x^2 + x - 6 = 0$  (c)  $x^2 - x + 6 = 0$  (d)  $x^2 + x + 6 = 0$
29. If one of the roots of  $x^2 - 2x + m = 0$  is  $-1$ , then  $m =$  .....  
(a) 3 (b)  $-3$  (c)  $-1$  (d) 1
30. The value of discriminant D.forthe equation  $(3x-14)^2=0$  is .....  
(a) 4 (b)  $\frac{14}{3}$  (c) 0 (d)  $\frac{-3}{14}$
31. Line segment joining A (1,2) and B(4,5) is divided in the ration 2 : 1 by P(3, a). Then, a = .....  
(a) 6 (b) 5 (c) 4 (d) 3
32. If  $\theta$  is the measure of an acute angle and  $\sqrt{3}\sin\theta = \cos\theta$ , then  $\theta$  is.....  
(a) 30 (b) 45 (c) 60 (d) 90
33. In  $\triangle ABC$ ,if  $m\angle ABC = 90$ ,  $m\angle ACB = 45$  and  $AC = 6$ , then area of  $\triangle ABC$  is.....  
(a) 18 (b) 36 (c) 9 (d)  $\frac{9}{2}$
34. If  $7\theta$  and  $2\theta$  are measure of acute angles such that  $\sin 7\theta = \cos 2\theta$ , then  $2\sin 3\theta - \sqrt{3}\tan 3\theta$  is .....  
(a) 1 (b) 0 (c)  $-1$  (d)  $1 - \sqrt{3}$
35. If the angles of elevation of a tower from two points distance 'a' and 'b' ( $a > b$ ) from its foot on the same side of the tower have measure 30 and 60, then the height of the tower is .....  
(a)  $\sqrt{a+b}$  (b)  $\sqrt{ab}$  (c)  $\sqrt{a-b}$  (d)  $\sqrt{\frac{a}{b}}$
36. A Chord of  $\square$  (0,5) touches  $\square$  (0,3). Therefore the length of the chord = .....  
(a) 8 (b) 10 (c) 9 (d) 6
37.  $\overline{OA}$  and  $\overline{OB}$  are the two mutually perpendicular radii of a circle having radius 9 cm. The area of the minor sector corresponding to  $\angle AOB$  is.....cm<sup>2</sup>. ( $\pi = 3.14$ ).  
(a) 63.575 (b) 63.585 (c) 63.595 (d) 63.60
38. If the area and the circumference of a circle are numerically equal, then  $r =$ .....  
(a)  $\pi$  (b)  $\frac{\pi}{2}$  (c) 1 (d) 2
39. If the ratio of the area of two circles is 1:4, then the ratio of their circumference .....  
(a) 1 : 4 (b) 1 : 2 (c) 4 : 1 (d) 2 : 1
40. The area of the largest triangle inscribed in a semi-circle of radius 8 is .....  
(a) 8 (b) 16 (c) 64 (d) 256
41. The volume of hemisphere with radius 1.2 cm is..... cm<sup>3</sup>.  
(a)  $1.152\pi$  (b)  $0.96\pi$  (c)  $2.152\pi$  (d)  $3.456\pi$

42. The volume of sphere is  $\frac{4}{3}\pi$  cm<sup>3</sup>. Then its diameter is ..... cm.  
 (a) 0.5 (b) 1 (c) 2 (d) 2.5
43. For some data  $Z - M = 2.5$ . If the mean of the data is 20, then  $Z =$  .....  
 (a) 21.25 (b) 22.75 (c) 23.75 (d) 22.25
44. The sum of deviations taken from the mean is always .....  
 (a) 1 (b) -1 (c) 0 (d) not fixed
45. The mean of a certain data is p. If each observation is multiplied by a and then b is subtracted from each result, the mean of the data so obtained is .....  
 (a)  $ap + b$  (b)  $ap - b$  (c)  $bp - a$  (d)  $\frac{p}{a} + b$
46.  $\sum_{i=1}^{20} (2x_i + 1) = 50$ , then  $\bar{x} =$  .....  
 (a) 1 (b) 0.75 (c) 15 (d) 13.5
47. If  $P(\bar{E}) = 0.47$ , then  $P(E)$  .....  
 (a) 0 (b) 0.20 (c) 0.50 (d) 0.53
48. The cubic polynomial  $p(x) = x^3 + 1$  has .....zeros.  
 (a) 0 (b) 1 (c) 2 (d) 3
49. The sum of zeros of  $3x^2 + 5x - 2$  is .....  
 (a)  $\frac{3}{5}$  (b)  $-\frac{3}{5}$  (c)  $\frac{5}{3}$  (d)  $-\frac{5}{3}$
50. The product of zeros of  $x^2 + 4x + 3$  is .....  
 (a) 1 (b) 3 (c) 4 (d) -4

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**PART-B****Instructions:**

- There are four sections in this question paper.
- All questions are compulsory.

**SECTION-A****SOLVE THE FOLLOWING (2 marks each)****[16]**

1. Find the square roots of the following in the form of a binomial surd :  $2 + \frac{2}{3}\sqrt{5}$ .
2. 4 is a zero of the cubic polynomial  $p(x) = x^3 - 3x^2 - 6x + 8$ . Find the remaining zeros of  $p(x)$ .
3. Which term of the arithmetic progression 3,10,17,.... would be 84 more than its 13<sup>th</sup> term.

OR

If  $m^{\text{th}}$  term of an arithmetic progression is  $\frac{1}{n}$  and  $n^{\text{th}}$  term is  $\frac{1}{m}$  then find the value of  $mn^{\text{th}}$  term.

4. In  $\triangle PQR$ , bisector of  $\angle R$  intersects  $\overline{PQ}$  in S. If  $2PS = 3SQ$  and  $PR = 8.4$ , then find QR.
5.  $A(1,7)$ ,  $B(2,4)$ ,  $C(k,5)$  are the vertices of right angled triangle, find 'k' if  $\angle C$  is a right angle.

OR

$A(-4,2)$ ,  $B(-2,1)$ ,  $C(4, -2)$  are collinear points. Find the ratio in which B divides  $\overline{AC}$  from A.

6.  $\overline{AB}$  is a Diameter of  $\odot (O,10)$ . A tangent is drawn from B to  $\odot (O,8)$  which touches  $\odot (O,8)$  at D.  $\overline{BD}$  intersects  $\odot (O,10)$  in C. Find AC.
7. Marks obtained by 50 students from 100 are as follow.

Marks	0-34	35-50	51-70	71-90	91-100
No. of students	8	9	14	11	8

Find the probability that a student gets (i) below 34 (ii)  $<91$  (iii)  $> 50$

8. Find mode

Class	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Freq.	12	17	28	23	7	8	5

## SECTION-B

SOLVE THE FOLLOWING (3 marks each)

[12]

9. In  $\triangle ABC$ ,  $m\angle C = 3m\angle B = 2(m\angle A + m\angle B)$ . Then find the measures of all three angles.
10. Find the value of x in,  $x \sin^2 45^\circ \cos 60^\circ = \frac{\cot^2 30^\circ \sec 60^\circ}{\tan^2 45^\circ \operatorname{cosec} 30^\circ}$

OR

Prove  $\frac{\cot \theta + \operatorname{cosec} \theta - 1}{\cot \theta - \operatorname{cosec} \theta + 1} = \operatorname{cosec} \theta + \cot \theta$

11. Find  $f_1$  and  $f_2$  if mean is 18 and  $n = 64$ .

Class	11-13	13-15	15-17	17-19	19-21	21-23	23-25
Frequency	7	$f_1$	9	13	$f_2$	5	4

12. A square is inscribed in a circular table cloth of radius 35 cm. If the Cloth is to be coloured blue leaving the square, then find the area to be coloured

**SECTION -C**

**SOLVE THE FOLLOWING (4 marks each) (12)**

13. A two digit number is such that the product of the digits is 6. When 9 is subtracted from the number the resulting number is the number obtained by interchanging of the digits. Find the original number.

**OR**

The faster train takes 1 hour less than the slower train for covering 400 km distance. If the speed of the slower train is 20 km/hr less than the speed of the faster train. Find the speed of slower train.

14. The CSA of a cone is  $550 \text{ cm}^2$  and its diameter is 14 cm. Find the volume of the cone.
15. A jet plane is at a vertical height of  $h$ . The angles of depression of two tanks on the horizontal ground are found to have measures  $\alpha$  and  $\beta$ . Prove that distance between the tanks is  $\frac{h(\tan \alpha - \tan \beta)}{\tan \alpha \cdot \tan \beta}$ .

**SECTION -D**

**SOLVE THE FOLLOWING (5 marks each) (10)**

16. Prove that 'Area of two similar triangles are proportional to square of corresponding sides'

**OR**

In the plane of  $\triangle RST$ , a line  $l \parallel \overline{ST}$  and  $l$  intersects  $\overline{RS}$  at N, then prove that

$$\frac{RM}{MS} = \frac{RN}{NT}.$$

17. Construct  $\triangle ABC$  similar to  $\triangle APQ$  with its sides having lengths equal to  $\frac{4}{3}$  times the lengths of corresponding sides of  $\triangle APQ$ .

**Best of Luck**