# QB365 <br> Model Question Paper - 3 <br> 10th Standard CBSE 

## Maths

Reg.No. :


Time : 02:00:00 Hrs

Total Marks : 100

## Section-A

1) If $\alpha$ and $\beta$ are the roots of $\mathrm{ax}^{2}-\mathrm{bx}+\mathrm{c}=0(a \neq 0)$, then calculate $\alpha+\beta$.
2) If sum of the zeroes of the quadatic polynomial $3 x^{2}-k x+6$ is 3 , then find the value of $k$.
3) If -1 is a zero of the polynomial $f(x)=x^{2}-7 x-8$, then calculate the other zero.
4) If $a m=b l$, then find whether the pair of linear equations $a x+b y=c$ and $l x+m y=n$ has no solutions, unique solution or infinitely many solutions.
5) If ad $\neq b c$, then find whether the pairs of linear equations $a x+b y=p$ and $c x+d y=q$ has no solution, unique solution or infinitely many solutions.
6) In $\triangle A B C, D E \| B C$, find the value of $x$.
7) Are two triangle with equal corresponding sides always similar?

Two triangles having corresponding sides equal are similar.
8) If $\tan \left(3 x+30^{\circ}\right)=1$, then find the value of $x$.
9) An observer 1.2 metere tall is 28.2 m away from the tower.The angle of elevation of the top of the tower from his eye is $60^{\circ}$.What is the height of the tower?
10) The top of two poles of height 16 m and 10 mare connected by a wire of length I metre.If wire makes an angle of $30^{\circ}$ with the horizontal, then find I .
11) Find the length of kite string flying at 100 m above the ground with the elevation of $60^{\circ}$
12) If one zero of the polynomial $\left(a^{2}+9\right) x^{2}+13 x+6 a$ is a reciprocal of the other, then find the value of $a$.
13) The sum and the product of a zeroes of the polynomial $f(x)=4 x^{2}-27 x+3 k^{2}$ are equal. Find the value of $k$.
14) The sum of remainders obtained when $x^{3}+(k+8) x+k$ is divided by $x-2$ and when is divided by $x+1$, is 0 . Find the value of $k$.
15) Form a quadratic polynomial $p(x)$ with 3 and $-\frac{2}{5}$ as sum and product of its zeroes, respectively.
16) Find the value for $k$ for which $x^{4}+10 x^{3}+25 x^{2}+15 x+k$ is exactly divisible by $x+7$.
17) Determine the values of $a$ and $b$, for which the following pairs of linear equations has infinitely many solutions
$3 x-(a+1) y=2 b-1$
and $5 x+(1-2 a) y=3 b$
18) Find whether the following pair of linear equations is consistent or inconsistent:
19) For what the value of ' $k$ ', the system of equations $k x+3 y=1,12 x+k y=2$ has no solution.
20) Solve the following pair of linear equations by substitution method:

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\begin{aligned}
& 3 x+2 y-7=0 \\
& 4 x+y-6=0
\end{aligned}
$$

## SEction - B

21) A boy goes 24 m due East and 7 m due South. How far is he from the starting point?
22) In the given figure, $D E \| B C$. If $A D=1.5 \mathrm{~cm}, \mathrm{BD}=2 \mathrm{AD}$, then find $\frac{\operatorname{ar}(\triangle A B C)}{\operatorname{ar}(\operatorname{trapeziumBCED})}$.
23) If $\tan A=\sqrt{2}-1$, prove that $\frac{\tan A}{1+\tan ^{2} A}=\frac{\sqrt{2}}{4}$.
24) In the given figure, $\triangle A B C$, is the right angles at $\mathrm{B} . \triangle B S C$ is right angles at S and $\mathrm{Bc}=7.5 \mathrm{~cm}, \mathrm{RS}=5 \mathrm{~cm}, \mathrm{RB}=6$ $\mathrm{cm} \angle B S R=x^{0}$ and $\angle S A B=y^{0}$. Find

(i) $\tan x^{0}$
(ii) $\sin y$
(ii) $\cos y^{0}$
25) Find the value of $\cos 2 \theta$, if $2 \sin 2 \theta=\sqrt{3}$
26) If $\alpha$ and $\beta$ are zeroes of a quadratic polynomial $x^{2}-5$, then form a quadratic polynomial whose zeroes are $1+\alpha$ and $1+\beta$.
27) Find the zeroes of the quadratic polynomial $5 x^{2}+8 x-4$ and verify the relationship between the zeroes and the coefficients of the polynomial.
28) When $p(x)=x^{2}+7 x+9$ is divided by $g(x)$, we get $(x+2)$ and -1 as the quotient and remainder respectively, find $\mathrm{g}(\mathrm{x})$.
29) Use elimination method to find all possible solutions of the following pair of linear equations
(i) $2 x+3 y=8$ and $4 x+6 y=7$
(ii) $a x+b y-a+b=0$ and $b x-a y-a-b=0$
30) Determine the values of $m$ and $n$ so that the following system of linear equations have
infinite number of solutions:
$(2 m-l) x+3 y-5=0$
$3 x+(n-l) y-2=0$
31) For what value of $p$ will the following system of equations have no solution?
32) Solve the following pair of equations for x and $\mathrm{y}: \frac{a^{2}}{x}-\frac{b^{2}}{y}=0, \frac{a^{2} b}{x}+\frac{b^{2} a}{y}=a+b$,

$$
x \neq 0 ; y \neq 0 .
$$

33) In the given figure, ABC is a right angled triangle, right angled at C and $D E \perp A B$. Prove that $\triangle A B C \sim \triangle A D E$ and hence find the lengths of $A E$ and $D E$.

34) From an airport, two aeroplanes start at the same time. If speed of first aeroplane due North is $500 \mathrm{~km} / \mathrm{h}$ and that of other due East is $650 \mathrm{~km} / \mathrm{h}$ then find the distance between the two aeroplanes after 2 hours.
35) $A B C$ is an isosceles triangle in which $A B=A C=10 \mathrm{~cm} . B C=12 \mathrm{~cm} . P Q R S$ is a rectangle inside the isosceles triangle. Given $\mathrm{PQ}=\mathrm{SR}=\mathrm{y} \mathrm{em}, \mathrm{PS}=\mathrm{QR}=2 \mathrm{x}$. Prove that $\mathrm{x}=6-\frac{3 y}{4}$.
36) A boy, flying a kite with a string of 90 m long, which is making an angle El with the ground. Find the height of the kite. (Given $\tan \theta=\frac{15}{8}$ )
37) The horizontal distance between two towers is 60 m . The angle of elevation of the top of the taller tower as seen from the top of the shorter one is $30^{\circ}$. If the height of the taller tower is 150 m , them find the height of the shorter tower.
38) Two poles of equal heights are standing opposite to each other on either side of a road, which is 80 m wide. From a point between them on the road, angles of elevation of their top are $30^{\circ}$ and $60^{\circ}$. Find the height of the poles and distance of point from poles.
39) Find the mean of the following distribution

| Height (in cm) | Less than 75 | Less than 100 | Less than 125 | Less than 150 | Less than 175 | Less than 200 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| No of students | 5 | 11 | 14 | 18 | 21 | 28 |
| Height (in cm) | Less than 225 | Less than 250 | Less than 275 | Less than 300 |  |  |
| No of students | 33 | 37 | 45 | 50 |  |  |

40) Find He mean of the following data:

| Classes | $0-20$ | $20-40$ | $40-60$ | $60-80$ | $80-100$ | $100-120$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Frequency | 6 | 8 | 10 | 12 | 8 | 4 |

## Section-C

41) Identify the type of the polynomials given below:
(i) $f(p)=3-p^{2}+\sqrt{7} p$
(ii) $p(v)=\sqrt{3 v^{4}}-\frac{2}{3} v+7$
(iii) $q(x)=\frac{\sqrt{2}}{5} x^{3}+1$
42) Reduce the following pair of equations into a pair of linear equations and solve them
(i) $\frac{2 x y}{x+y}=\frac{3}{2}, \quad \frac{x y}{2 x-y}=\frac{-3}{10} ; \quad x+y \neq 0, \quad 2 x-y \neq 0$
(ii) $\frac{2}{2 x+3 y}+\frac{3}{3 x-2 y}=\frac{17}{15}$,
$\frac{5}{3 x+2 y}+\frac{1}{3 x-2 y}=2$
43) $\mathrm{D}, \mathrm{E}$ and F are respectively the mid-points of sides $\mathrm{AB}, \mathrm{BC}$ and CA of $\triangle A B C$. Find the ratio of the areas of

5
$\triangle D E F$ and $\triangle A B C$.
44) In $A B C, A D \perp B C$ and point $D$ lies on $B C$ such that $2 D B=3 C D$. Prove that $5 A B^{2}=5 A C^{2}+B C^{2}$.
45) Prove that: $\frac{\tan \theta+\sin \theta}{\tan \theta-\sin \theta}=\frac{\sec \theta+1}{\sec \theta-1}$
46)

$$
\text { Evaluate : } \frac{\cot \left(90^{\circ}-\theta\right) \sin \left(90^{\circ}-\theta\right)}{\sin \theta}+\frac{\cot 40^{\circ}}{\tan 50^{\circ}}-\left(\cos ^{2} 20^{\circ}+\tan ^{2} 70^{\circ}\right)
$$

47) 

$$
\text { Evaluate }: \frac{\operatorname{cosec}^{2}\left(90^{\circ}-\theta\right)-\tan ^{2} \theta}{4\left(\cos ^{2} 40^{\circ}+\cos ^{2} 50^{\circ}\right)}-\frac{2 \tan ^{2} 30^{\circ} \sec ^{2} 52^{\circ} \sin ^{2} 38^{\circ}}{3\left(\operatorname{cosec}^{2} 70^{\circ}-\tan ^{2} 20^{\circ}\right)}
$$

48) A health officer took an initiative of organising a medical camp in a remote village. The medical checkup of 35
students of the age group of 10 yr and their weights were recorded as follows:

| Weight (in kg) | Number of students |
| :---: | :---: |
| $38-40$ | 3 |
| $40-42$ | 2 |
| $42-44$ | 4 |
| $44-46$ | 5 |
| $46-48$ | 14 |
| $48-50$ | 4 |
| $50-52$ | 3 |

(i) Find the mean weight of students using step deviation method.
(ii) Which value of health officer was depicted in this situation?

