## EXERCISE

**1.** Present price of a machine is Rs 2P and if price of the machine decrease by 2r% in each

year, the price of machine after 2n years will be.

A. $RsP\left(1 - \dfrac{r}{100}\right)^n$

B. $Rs2P\left(1 - \dfrac{r}{50}\right)^n$

C. $RsP\left(1 - \dfrac{r}{50}\right)^{2n}$

D. $Rs2P\left(1 - \dfrac{r}{50}\right)^{2n}$

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**2.** যদি $2a = 3b = 4c$ হয়, তবে $a:b:c$ =?

A. $3:4:6$

B. $4:3:6$

C. $3:6:4$

D. $6:4:3$

**3.** The length of each of two parallel chords AB and CD is 16cm. If the radius of the circle be

10cm, then the distance between the two chords is

A. 12 cm

B. 16 cm

C. 20 cm

D. 5 cm

**4.** If $\alpha + \beta = 90°$ and $\cot \alpha = \dfrac{4}{3}$ then $\cot \beta$ =

A. $\dfrac{3}{4}$

B. $\dfrac{4}{3}$

C. $\dfrac{3}{5}$

D. $\dfrac{4}{5}$

**5.** If from a solid cube with the edge of x unit length, the largest solid sphere is cutout, then the length of the diameter of the sphere is

A. x unit

B. 2x unit

C. $\dfrac{2}{x}$ unit

D. 4 x unit

**6.** If the mean of 6,7,x,8,y,16,16 is 9, then.

A. x+y =21

B. x+y = 19

C. x-y = 21

D. x=y = 19

**7. Fill in blanks**

Pallabi invests Rs 500 for 9 months and Razia invests Rs 600 for 5 months. Ratio to profit will be____.

**8.** If the product of two roots of the equation

$x^2 - 3x + k = 10$ is -2 then k=

**9.** If two circle do not intersect or touch each

other, then the maximum number of common

tangents can be drawn is

**10.** Fill in blanks

$\sin 12° - \cos 78° =$ ____ .

**11.** Fill in blanks

By melting a solid sphere, a right circular cylinder is made. The volume of the sphere and cylinder are_____ .

**12.** Fill in blanks

If the mean of $x_1, x_2, \ldots, x_n$ is $batx$, then mean of $ax_1, ax_2, \ldots, ax_n$ will be _____.

$(a \neq 0)$.

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**13.** Write True or False

if the principal and the rate of simple interest in percent per annum be constants, then the total interest and the time are inverse relation.

**14.** Write True or False

Compound ratio of $ab : c^2$, $bc : a^2$ and $ca : b^2$ is 1:1.

**15.** Write True or False

For any angle $\theta$, $\sin\theta = \dfrac{4}{3}$ is possible.

**16.** Write True or False

If in a circle of radius 10cm length, a chord subtends right angle at the centre, then the length of the chord will be 5cm.

**17.** Write True or False

If two solid hemispheres of same type whose base radii are r unit each and if they are

connected along base. Then the total surface area of the connected solid is $6\pi r^2$ sq.unit.

**18.** Write True or False

Median of 3,14,18,20,5 is 18.

**19.** The ratio of capitals of three persons is 3:8:5 and the profit of 1st person is Rs 60 less

of the 3rd person. Calculate the profit in this business.

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**20.** Calculate the rate of compound interest per annum, so that the amount on RS 400 for 2 years becomes Rs 441.

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**21.** If the one root of $x^2 + bx + 12 = 0 \, is \, 2$ and $\sqrt[s]{o}f \, x^2 + bx + q = 0 \, are \, equal$ , then find the value of q.

**22.** If $x = 3 + 2\sqrt{2}$ then find the value of $x + \dfrac{1}{x}$.

**23.** In triangle ABC, AB = (2a-1)cm, $AC = 2\sqrt{2a}$ cm, BC = (2a+1)cm, find $\angle BAC$.

**24.** The lengths of radii of two circles are 8 cm and 3 cm and the distance between two centres is 13 cm. What is the length of the direct common tangent of two circle?

**25.** In this figure, O is the centre and AC is the diameter. If $\angle AOB = 80°$ and $\angle ACE = 10°$ then find the value of $\angle BED$.

**26.** If $\sec 5A = \cos ec(A + 36°)$ and 5A is positive acute angle then find A.

**27.** The ratio of volumes of a solid right circular cone, a solid sphere and a solid right circular cylinder each of whose radius and height are equal is

**28.** If the length of radius of a sphere is increased by 50%, then how much percent will be increased of its curved surface area.

**29.** Write the value of complementary angle of $63° 35' 15''$.

**30.** In a frequency distribution, mean is 8.1, $\sum f_i x_i = 132 + 5k$ and $\sum f_i = 20$ . Find the value of k.

**31.** At present the sum of the number of students in all the secondary institutions in a district is 3993. If the number of students increased in a year was 10% of that in the previous year, then find the sum of the number of students in all the secondary institutions in the districts 3 years before?

**32.** Rakhadidi deposited Rs 10,000 of her savings in two separate banks at the same

time. The rate of simple interest per annum is of 6% in one bank and that of 7% in the other bank, after 2years, if she gets Rs 1280 in totoal as interested, then find the money she had deposited separately in eahc of 2 banks.

**33.** If one root of the equation $ax^2 + bx + c = 0 (a \neq 0)$ is twice the other, than show that $2b^2 = 9ac$.

**34.** Solve:

$$\frac{a}{ax - 1} + \frac{b}{bx - 1} = a + b\left(x \neq \frac{1}{a}, \frac{1}{b}\right).$$

**35.** If $x = \dfrac{\sqrt{7} + \sqrt{3}}{\sqrt{7} - \sqrt{3}}$ and xy= 1 then find the value of $\dfrac{x^2 - xy + y^2}{x^2 + xy + y^2}$.

**36.** y is sum of two variables, one in which varies directly with x and another varies inversely with x. When x= 1 then y = 1 and x = 3 the y = 5. Find the relation between x and y,

**37.** If $x = \dfrac{4ab}{a + b}$ then show that $\dfrac{x + 2b}{x - 2b} + \dfrac{x + 2b}{x - 2b} = 2.$

**38.** If a,b,c,d are in continued proportion then

show that

$(b-c)^2 + (c-a)^2 + (b-d)^2 = (a-d)^2.$

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**39.** State and Prove Pythagoras theorem.

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**40.** Prove that if any straight line passing through the centre of a circle bisects any chord, which is not a diameter, then the straight line will be perpendicular on that chord.

**41.** The two chords AB and AC of a circle are equal, prove that the bisector, of $\angle BAC$ passes through the centre of the circle.

**42.** Two acute angled traingle ABC and PQR are similar. Their circumcentres are X,Y respectively. If BC and QR are corresponding sides, then prove that BX: QY = BC:QR.

**43.** Draw a right angled triangle whose adjacent sides of the right angle are 7 cm and 9 cm. Now draw the incircle of this triangle.

**44.** Draw a square whose area is equal to a rectangle of 6cm length and 3 cm breadth.

**45.** Express $40^{\circ}16'24''$ in radian.

**46.** Find the value/values of $\theta(0^\circ \le \theta \le 90^\circ)$ for which $2\sin\theta\cos\theta = \cos\theta$.

**47.** If $\sin 17^\circ = \dfrac{x}{y}$ show that $\sec 17^\circ - \sin 73^\circ = \dfrac{x^2}{y\sqrt{y^2 - x^2}}$.

**48.** If the angle of elevation of the top of monument when observed from a point on the roof of a five-stories building of 18 metre height is $45°$ and the angle depression of the foot of the monumenbt. When observed from the same pointy is $60°$. Calculate the height of the monument. $\left[\sqrt{3} = 1.732\right]$

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**49.** A man standing on a railway bridge $5\sqrt{3}$ meters high, observes the engine of a train at an angle of depression $30°$. But after 2 seconds, he observes the engine at an angle of depression $45°$ on the other side of the bridge. Find the speed of the train.

**50.** $127\dfrac{2}{7}$ sq.cm of sheet is required to make a hemispherical bowl. Calculate the length of

diameter of the forepart of the bowl.

**51.** If a solid silver sphere of diameter of 6 cm is melted and re-casted into a solid right circular rod of same diameter, then determine the length of height of the rod.

**52.** Half of the cuboidal water tank with length 2.1m and breadth of 1.5m is filled with water. If 630 lit water is poured more into the tank, then calculate and write the depth that will be increased by.

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**53.** Find the mode from following freqeuncy distribution table.

| Age (in yrs) | 16-18 | 18-20 | 20-22 | 22-24 | 24-26 |
|---|---|---|---|---|---|
| No. of candidates | 45 | 75 | 38 | 22 | 20 |

## 54. Find the median of given data :

| Class interval | 1-5 | 6-10 | 11-15 | 16-20 | 21-25 | 26-30 | 31-35 |
|---|---|---|---|---|---|---|---|
| Frequency | 2 | 3 | 6 | 7 | 5 | 4 | 3 |

## 55. Draw an ogive (less than type) from the following frequency distribution table.

| Class | 50-60 | 60-70. | 70-80 | 80-90 | 90-100 |
|---|---|---|---|---|---|
| frequency | 4 | 8 | 12 | 6 | 10 |