

[ENGLISH VERSION]

(New Syllabus)

Only for the candidates appearing in 2019 for the first time and for unsuccessful candidates (Continuing, Compartmental, External Compartmental and E.W.) who appeared in 2017 and 2018 for the first time.

(The answers of the question Nos. 1, 2, 3 and 4 are to be given at the beginning of the answer script mentioning the question numbers in the serial order. Necessary calculation and drawing, if any, must be given on the right hand side by drawing margins on the first few pages on the answer-script. Tables and Calculators are not allowed. Approximate value of π may be taken as $\frac{22}{7}$, if necessary. Graph paper will be supplied, if required. Arithmetic problems may be solved by algebraic method.)

(Alternative question of 11 is given on page No. 19 for sightless candidates)

[Additional Question number 16 only for external candidates is given on Page No. 20]

1. Choose the correct option in each case from the following questions : 1×6=6

(i) In a partnership business, the ratio of share of

profit of two friends is $\frac{1}{2} : \frac{1}{3}$, then the ratio of their principal is —

- (a) 2 : 3 (b) 3 : 2
(c) 1 : 1 (d) 5 : 3

(New Syllabus)

(ii) If $p + q = \sqrt{13}$ and $p - q = \sqrt{5}$ then the value of pq is —

- (a) 2 (b) 18
(c) 9 (d) 8

(iii) O is the centre of a circle and AB a diameter. $ABCD$ is a cyclic quadrilateral. $\angle ABC = 65^\circ$, $\angle DAC = 40^\circ$, then the measure of $\angle BCD$ is —

- (a) 75° (b) 105°
(c) 115° (d) 80°

(iv) If $\tan \alpha + \cot \alpha = 2$, then the value of $\tan^3 \alpha + \cot^3 \alpha$ is —

- (a) 13 (b) 2
(c) 1 (d) 0

(v) If two cubes of length of each side $2\sqrt{6}$ cm are placed side by side, then the length of the diagonal of the cuboid so produced is —

- (a) 10 cm (b) 6 cm
(c) 2 cm (d) 12 cm

(vi) The mean of the data $x_1, x_2, x_3, \dots, x_{10}$ is 20 then the mean of $x_1 + 4, x_2 + 4, x_3 + 4, \dots, x_{10} + 4$ will be —

- (a) 20 (b) 24
(c) 40 (d) 10

2. Fill up the blanks (any *five*) : $1 \times 5 = 5$

(i) A person deposited Rs. 100 in a bank and gets the amount Rs. 121 after two years. The rate of compound interest is _____ %.

(ii) If the product and sum of two quadratic surds is a rational number, then surds are _____ surd.

(iii) If the bases of two triangles are situated on same line and the other vertex of the two triangles are common, then the ratio of the areas of two triangles are _____ to the ratio of their bases.

(iv) The simplest value of $\frac{\cos 53^\circ}{\sin 37^\circ}$ is _____.

(v) Number of surfaces of a solid right circular cylinder is _____.

(vi) The variables x_1, x_2, \dots, x_{100} are in ascending order of their magnitude, then the median of the variables is _____.

3. Write True or False (any *five*) : $1 \times 5 = 5$

(i) The difference between the simple interest and the compound interest of Rs. 100 in 1 year at the rate of 10% p.a. is Re. 1.

(ii) The compound ratio of $ab : c^2$, $bc : a^2$ and $ca : b^2$ is 1 : 1.

(iii) Only one circle can be drawn through three non-collinear points.

(iv) $\sin 30^\circ + \sin 60^\circ > \sin 90^\circ$.

(v) The ratio of the volume of a right circular cone and a right circular cylinder with same base and height is 1 : 3.

(vi) Value of median of data 2, 3, 9, 10, 9, 3, 9 is 10.

4. Answer the following questions (any *ten*) :

$$2 \times 10 = 20$$

(i) Find the capital which gives Re. 1 as interest per month at 5% rate of interest per annum.

(ii) In a partnership business the ratio of capitals of three men is 3 : 5 : 8. The share of profit of the first member is Rs. 60 less than that of the third member, then what is the total profit in the business ?

(iii) If $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{2a-3b+4c}{p}$, then find p .

(iv) $x \propto y^2$ and $y = 2a$ when $x = a$, then show that $y^2 = 4ax$. 5.

(v) In a trapezium $ABCD$, $BC \parallel AD$ and $AD = 4$ cm. The two diagonals AC and BD intersect at the point O in such a way that $\frac{AO}{OC} = \frac{DO}{OB} = \frac{1}{2}$.

Calculate the length of BC .

(vi) Two chords AB and AC of a circle are mutually perpendicular to each other. If $AB = 4$ cm and $AC = 3$ cm, find the length of the radius of the circle.

(New Syllabus)

- (vii) In ΔABC , $\angle ABC = 90^\circ$ and $BD \perp AC$, if $AB = 5$ cm, $BC = 12$ cm, then find the length of BD .
- (viii) Find the value/values of θ ($0^\circ \leq \theta \leq 90^\circ$) for which $2 \sin \theta \cos \theta = \cos \theta$.
- (ix) If $\sin 10\theta = \cos 8\theta$ and 10θ is a positive acute angle, then find the value of $\tan 9\theta$.
- (x) The length, breadth and height of a cuboidal room be a unit, b unit, and c unit respectively and $a + b + c = 25$, $ab + bc + ca = 240.5$ then find the length of the longest rod to be kept inside the room.
- (xi) The area of curved surface of a right circular cone is $\sqrt{5}$ times of that of the base of the cone, find the ratio of the height and the radius of the base.
- (xii) The mid value of first $(2n + 1)$ consecutive natural number is $\frac{n+103}{3}$. Find n .

5. Answer any **one** question : 5
- (i) If interest is compounded half yearly what will be the compound interest and amount on Rs. 8,000 at the rate of 10% compound interest per annum for $1\frac{1}{2}$ years ?
- (ii) Two friends start a partnership business investing Rs. 40,000 and Rs. 50,000 respectively. There is an agreement between them that 50% of the profit will be divided equally and rest amount of profit will be distributed between them in the ratio of their principal. If the share of profit of 1st friend is Rs. 800 less than that of the 2nd friend, find the share of profit of the 1st friend.

(New Syllabus)

6. Solve any **one** question : 3
- (i) Determine the equation whose roots are the square of the roots of the equation $x^2 + x + 1 = 0$.
- (ii) If the price of 1 dozen pen is reduced by Rs. 6, then 3 more pens will be got in Rs. 30. Calculate the price of 1 dozen pen before the reduction of price.
7. Answer any **one** question : 3
- (i) Simplify : $\frac{4\sqrt{3}}{2-\sqrt{2}} - \frac{30}{4\sqrt{3}-\sqrt{18}} - \frac{\sqrt{18}}{3-\sqrt{12}}$.
- (ii) If $\left(\frac{1}{x} - \frac{1}{y}\right) \propto \frac{1}{x-y}$, then show that $(x^2 + y^2) \propto xy$.
8. Answer any **one** question : 3
- (i) If $(3x - 2y) : (x + 3y) = 5 : 6$, then find the value of $(2x + 5y) : (3x + 4y)$.
- (ii) If $\frac{b+c-a}{y+z-x} = \frac{c+a-b}{z+x-y} = \frac{a+b-c}{x+y-z}$, then prove that $\frac{a}{x} = \frac{b}{y} = \frac{c}{z}$. <http://www.wbbseonline.com>
9. Answer any **one** question : 5
- (i) Prove that semicircular angle is a right angle.
- (ii) If two circles touch each other externally then the point of contact will lie on the line-segment joining the two centres — Prove it.

(New Syllabus)

10. Answer any **one** question : 3

- (i) If a quadrilateral $ABCD$ is circumscribed about a circle with centre O , prove that $AB + CD = BC + DA$.
- (ii) If in ΔABC , $\angle A$ is right angle and BP and CQ are two medians, then prove that, $5BC^2 = 4(BP^2 + CQ^2)$.

11. Answer any **one** question : 5

- (i) Draw a triangle ABC of which $BC = 7$ cm, $AB = 5$ cm and $AC = 6$ cm. Then draw the circum-circle of ΔABC . (Only traces of construction are required)
- (ii) Construct a circle of radius 4 cm and draw two tangents to the circle from an external point at a distance of 6.5 cm from the centre of the circle.

12. Answer any **two** questions : $3 \times 2 = 6$

- (i) In ΔABC , $\angle C = 90^\circ$, if $BC = m$ and $AC = n$ then prove that

$$m \sin A + n \sin B = \sqrt{m^2 + n^2}.$$

- (ii) Find the value of

$$\frac{4}{3} \cot^2 30^\circ + 3 \sin^2 60^\circ - 2 \operatorname{cosec}^2 60^\circ - \frac{3}{4} \tan^2 30^\circ.$$

- (iii) If $\angle P + \angle Q = 90^\circ$ then show that

$$\sqrt{\frac{\sin P}{\cos Q}} - \sin P \cos Q = \cos^2 P.$$

(New Syllabus)

13. Answer any **one** question : 5

- (i) From a quay of a river, 600 metres wide, two boats start in two different directions to reach the opposite side of the river. The first boat moves making an angle of 30° with this bank and the second boat moves making an angle 90° with direction of the first boat. What will be the distance between the two boats when both of them reach the other side?
- (ii) The length of the flag post at the roof of a three storied building is 3.6 metre. The angles of elevation of the top and foot of the post are 50° and 45° respectively from a point on the road. Find the height of the building.
[Take $\tan 50^\circ = 1.2$]

14. Answer any **two** questions : $4 \times 2 = 8$

- (i) If 64 buckets of water is withdrawn from a cubical water tank, full of water, then $\frac{1}{3}$ of water in the tank still remains. If the length of the side of the water tank is 1.2 metre then what is the capacity (in litre) of each bucket? (1 cubic decimeter = 1 litre)
- (ii) The diameter of cross-section of a wire is reduced by 50%. If the volume remains constant, what percent of length of the wire should be increased?
- (iii) 77 sq. m tripal is required to make a right circular conical tent. If the slant height of the tent is 7 m, then what is the area of the base of the tent?

(New Syllabus)

15. Answer any *two* questions :

4×2=8

- (i) If the arithmetic mean of the following frequency distribution is 54, then find the value of K :

Class	0-20	20-40	40-60	60-80	80-100
Frequency	7	11	K	9	13

- (ii) Making frequency distribution table from the given cumulative frequency distribution table, find the mode of the data :

Class	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50	Less than 60	Less than 70	Less than 80
Frequency	4	16	40	76	96	112	120	125

- (iii) Find the mean of 52 students of class X in a school by using direct method and assumed mean method from the table given below :

No. of Students	4	7	10	15	8	5	3
Marks	30	33	35	40	43	45	48

[Alternative Question for Sightless Candidates]

11. Answer any *one* question :

5

- (i) Three sides of a triangle are given. Describe the procedure of construction of circumcircle of the triangle.
- (ii) Describe the process of drawing two tangents to a circle from an external point.