Series JBB/1

SET-3

कोड नं.
Code No. 430/1/3

रोल नं.
Roll No.

परीक्षार्थी कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें।
Candidates must write the Code on the title page of the answer-book.

नोट	Note
(I) कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ **15** हैं।	(I) Please check that this question paper contains **15** printed pages.
(II) प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए कोड नम्बर को छात्र उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें।	(II) Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
(III) कृपया जाँच कर लें कि इस प्रश्न-पत्र में **40** प्रश्न हैं।	(III) Please check that this question paper contains **40** questions.
(IV) **कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, प्रश्न का क्रमांक अवश्य लिखें।**	(IV) **Please write down the Serial Number of the question in the answer-book before attempting it.**
(V) इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है। प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा। 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका में कोई उत्तर नहीं लिखेंगे।	(V) 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

गणित (बुनियादी)

MATHEMATICS (BASIC)

निर्धारित समय : 3 घण्टे
Time allowed : 3 hours

अधिकतम अंक : 80
Maximum marks : 80

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) *This question paper comprises four sections – A, B, C and D. This question paper carries 40 questions. All questions are compulsory.*

(ii) *Section A : Q. No. 1 to 20 comprises of 20 questions of one mark each.*

(iii) *Section B : Q. No. 21 to 26 comprises of 6 questions of two marks each.*

(iv) *Section C : Q. No. 27 to 34 comprises of 8 questions of three marks each.*

(v) *Section D : Q. No. 35 to 40 comprises of 6 questions of four marks each.*

(vi) *There is no overall choice in the question paper. However, an internal choice has been provided in 2 questions of one mark each, 2 questions of two marks each, 3 questions of three marks each and 3 questions of four marks each. You have to* ***attempt only one of the choices*** *in such questions.*

(vii) *In addition to this, separate instructions are given with each section and question, wherever necessary.*

(viii) *Use of calculators is not permitted.*

SECTION - A

Q. Nos. 1 to 10 are multiple choice questions. Select the correct option.

1. The median and mode respectively of a frequency distribution are 26 and 29. Then its mean is 1

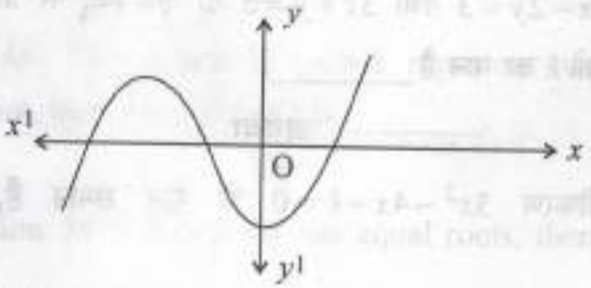
(a) 27.5 (b) 24.5 (c) 28.4 (d) 25.8

2. If the distance between the points A(4, p) and B(1, 0) is 5 units, then the value(s) of p is (are) 1

(a) 4 only (b) –4 only (c) ±4 (d) 0

3. The graph of a polynomial is shown in Fig. 1, then the number of its zeroes is 1

Fig. 1



(a) 3 (b) 1 (c) 2 (d) 4

4. $2.\overline{35}$ is 1

(a) an integer (b) a rational number

(c) an irrational number (d) a natural number

5. HCF of 144 and 198 is 1

(a) 9 (b) 18 (c) 6 (d) 12

6. The probability that a number selected at random from the numbers 1, 2, 3, ..., 15 is a multiple of 4 is 1

(a) $\frac{4}{15}$ (b) $\frac{2}{15}$ (c) $\frac{1}{15}$ (d) $\frac{1}{5}$

7. 225 can be expressed as 1

(a) 5×3^2 (b) $5^2\times3$ (c) $5^2\times3^2$ (d) $5^3\times3$

8. QP is a tangent to a circle with centre O at a point P on the circle. If Δ OPQ is isosceles, then $\angle$OQP equals. 1

(a) 30° (b) 45° (c) 60° (d) 90°

9. If α and β are the zeroes of the polynomial x^2+2x+1, then $\frac{1}{\alpha}+\frac{1}{\beta}$ is equal to 1

(a) –2 (b) 2 (c) 0 (d) 1

10. The coordinates of a point A on y-axis, at a distance of 4 units from x-axis and below it, are 1

(a) (4, 0) (b) (0, 4) (c) (–4, 0) (d) (0, –4)

In Q. Nos. 11 to 15, fill in the blanks.

11. If the equations $kx-2y=3$ and $3x+y=5$ represent two intersecting lines at unique point, then the value of k is _____. 1

Or

If quadratic equation $3x^2-4x+k=0$ has equal roots, then the value of k is _____.

12. If $\tan(A+B)=\sqrt{3}$ and $\tan(A-B)=\frac{1}{\sqrt{3}}$, $A>B$, then the value of A is _____. 1

13. The perimeters of two similar triangles are 25 cm and 15 cm respectively. If one side of the first triangle is 9 cm, then the corresponding side of second triangle is _____. 1

14. If the point C(k, 4) divides the line segment joining two points A(2, 6) and B(5, 1) in ratio 2:3, the value of k is _____. 1

Or

If points A(–3, 12), B(7, 6) and C(x, 9) are collinear, then the value of x is _____.

15. If $\cot\theta=\frac{12}{5}$, then the value of $\sin\theta$ is _____. 1

In Q. Nos. 16 to 20, answer the following.

16. The nth term of an AP is $(7-4n)$, then what is its common difference? 1

17. If $5\tan\theta=3$, then what is the value of $\left(\frac{5\sin\theta-3\cos\theta}{4\sin\theta+3\cos\theta}\right)$? 1

18. The areas of two circles are in the ratio 9:4, then what is the ratio of their circumferences? 1

19. If a pair of dice is thrown once, then what is the probability of getting a sum of 8? 1

20. The areas of two similar triangles ABC and PQR are 25 cm^2 and 49 cm^2 respectively. If QR = 9.8 cm, find BC. 1

SECTION - B

Q. Nos. 21 to 26 carry two marks each.

21. Prove that $\sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = \sec\theta - \tan\theta$. 2

Or

Prove that $\frac{\tan^2\theta}{1+\tan^2\theta} + \frac{\cot^2\theta}{1+\cot^2\theta} = 1$

22. Two different dice are thrown together, find the probability that the sum of the numbers appeared is less than 5. 2

Or

Find the probability that 5 Sundays occur in the month of November of a randomly selected year.

23. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball at random from the bag is three times that of a red ball, find the number of blue balls in the bag. 2

24. The radii of two circles are 19 cm and 9 cm respectively. Find the radius of a circle which has circumference equal to sum of their circumferences. 2

25. Divide the polynomial $16x^2 + 24x + 15$ by $(4x + 3)$ and write the quotient and the remainder. 2

26. If tangents PA and PB drawn from an external point P to a circle with centre O are inclined to each other at an angle of 80°, then find $\angle POA$. 2

SECTION - C

Q. Nos. 27 to 34 carry 3 marks each.

27. Draw a circle of radius 4 cm. From a point 7 cm away from the centre of circle. Construct a pair of tangents to the circle. 3

Or

Draw a line segment of 6 cm and divide it in the ratio 3:2.

28. Prove that $(1 + \tan A - \sec A) \times (1 + \tan A + \sec A) = 2 \tan A$ 3

Or

Prove that $\frac{\text{cosec}\,\theta}{\text{cosec}\,\theta - 1} + \frac{\text{cosec}\,\theta}{\text{cosec}\,\theta + 1} = 2\sec^2\theta$

29. Given that $\sqrt{3}$ is an irrational number, show that $(5 + 2\sqrt{3})$ is an irrational number. 3

Or

An army contingent of 612 members is to march behind an army band of 48 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?

Read the following passage carefully and then answer the questions given at the end.

30. To conduct Sports Day activities, in your rectangular shaped school ground ABCD, lines have been drawn with chalk powder at a distance of 1 m each. 100 flower pots have been placed at a distance of 1 m from each other along AD, as shown in Fig. 2. Niharika runs $\frac{1}{4}$th the distance AD on the 2nd line and posts a green flag. Preet runs $\frac{1}{5}$th the distance AD on the eighth line and posts a red flag.

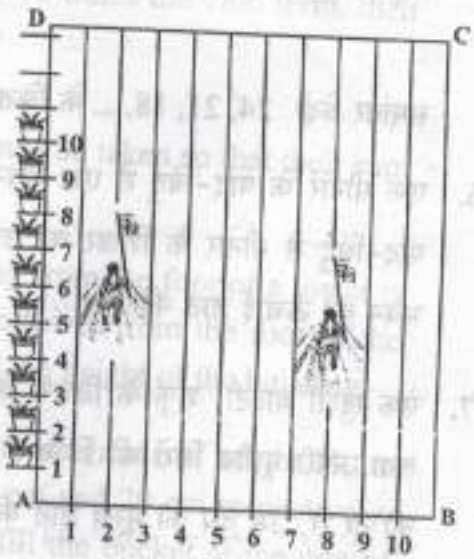


Fig. 2

3

(i) What is the distance between the two flags?

(ii) If Rashmi has to post a blue flag exactly half way between the line segment joining the two flags, where should she post the blue flag?

31. Solve graphically : $2x + 3y = 2$, $x - 2y = 8$ 3

32. Find the zeroes of the quadratic polynomial $6x^2 - 3 - 7x$ and verify the relationship between the zeroes and the coefficients. 3

33. Three horses are tied each with 7 m long rope at three corners of a triangular field having sides 20 m, 34 m and 42 m. Find the area of the plot which can be grazed by the horses. 3

34. Prove that the tangents drawn at the end points of a diameter of a circle are parallel. 3

SECTION - D

Q. Nos. 35 to 40 carry 4 marks each.

35. If 4 times the 4th term of an AP is equal to 18 times the 18th term, then find the 22nd term. 4

Or

How many terms of the AP : 24, 21, 18, ... must be taken so that their sum is 78?

36. The angle of elevation of the top of a building from the foot of a tower is 30°. The angle of elevation of the top of the tower from the foot of the building is 60°. If the tower is 60 m high, find the height of the building. 4

37. An open metal bucket is in the shape of a frustum of cone of height 21 cm with radii of its lower and upper ends are 10 cm and 20 cm respectively. Find the cost of milk which can completely fill the bucket at the rate of ₹ 40 per litre. 4

Or

A solid is in the shape of a cone surmounted on a hemisphere. The radius of each of them being 3.5 cm and the total height of the solid is 9.5 cm. Find the volume of the solid.

38. Find the mean of the following data : 4

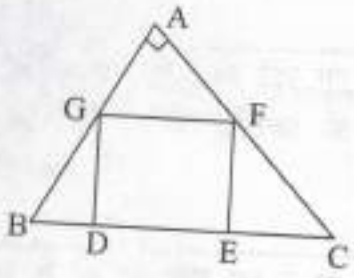
Classes	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	20	35	52	44	38	31

39. In Fig. 3, DEFG is a square in a triangle ABC right angled at A. Prove that 4

(i) $\Delta AGF \sim \Delta DBG$

(ii) $\Delta AGF \sim \Delta EFC$

Fig. 3



Or

In an obtuse ΔABC ($\angle B$ is obtuse), AD is perpendicular to CB produced. Then prove that $AC^2 = AB^2 + BC^2 + 2BC \times BD$.

40. A person on tour has ₹ 4200 for his expenses. If he extends his tour for 3 days, he has to cut down his daily expenses by ₹ 70. Find the original duration of the tour. 4