

SET-04**Series JSK/2**Code No. **030/2/4**

Roll No.

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Candidates must write the Code on the title page of the answer-book

- (i) Please check that this question paper contains **12** printed pages.
- (ii) Please check that this question paper contains **50** Multiple Choice Questions (MCQs).
- (iii) Question Paper Code given on the top right hand side of the question paper should be written in the appropriate place in the OMR Sheet by the candidate
- (iv) 20 minute additional time has been allotted to read this question paper prior to actual time of commencement of the examination.

MATHEMATICS (THEORY)

Term-I

Time allowed : 90 minutes

Maximum Marks : 40

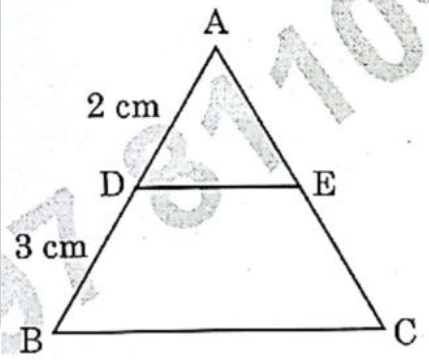
General Instructions :

Read the following instructions very carefully and strictly follow them :

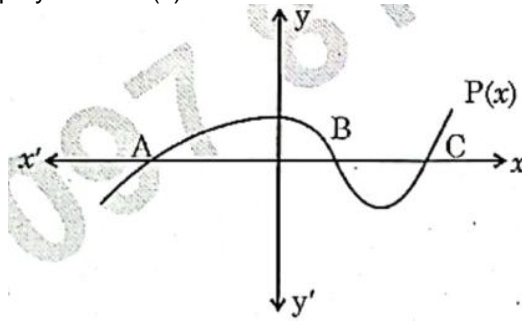
- (i) This question paper contains **50 questions** out of which 40 questions are to be attempted. All questions carry equal marks.
- (ii) This question paper consists of three sections — Section A, B, and C
- (iii) Section A contains **20 questions**. Attempt any **16 questions** from Q. No. 1 to 20.
- (iv) Section B contains **20 questions**. Attempt any **16 questions** from Q. No. 21 to 40.
- (v) Section C contains of two Case Studies containing 5 questions in each case. Attempt any **4 questions** from Q. No. 41 to 45 and **another 4** from Q. No. 46 to 50.
- (vi) There is only one correct Option for every multiple choice question (MCQ). Marks will not be awarded for answering more than one option.
- (vii) There is no negative marking.

SECTION - A

Q. No. 1 to 20 are of 1 mark each. Attempt any 16 from Q. 1 to 20.

1. The exponent of 5 in the prime factorization of 3750 is
 (a) 3 (b) 4 (c) 5 (d) 6
Ans. (b)
2. The graph of a polynomial P(x) cuts the x-axis at 3 points and touches it at 2 other points. The number of zeros of P(x) is :
 (a) 1 (b) 2 (c) 3 (d) 5
Ans. (d)
3. The value of x and y satisfying the two equations $32x + 33y = 34$, $33x + 32y = 31$ respectively are:
 (a) -1,2 (b) -1, 4 (c) 1, -2 (d) -1,-4
Ans. (a)
4. If $A(3, \sqrt{3})$, $B(0,0)$ and $C(3,k)$ are the three vertices of an equilateral triangle ABC, then the value of k is
 (a) 2 (b) -3 (c) $-\sqrt{3}$ (d) $-\sqrt{2}$
Ans. (c)
5. In figure $DE \parallel BC$, $AD = 2$ cm and $BD = 3$ cm, then $\text{ar}(\triangle ABC) : \text{ar}(\triangle ADE)$ is equal to
- 
- Ans.** (a) 4 : 25 (b) 2 : 3 (c) 9 : 4 (d) 25 : 4
6. If $\cot \theta = \frac{1}{\sqrt{3}}$, the value of $\sec^2 \theta + \text{cosec}^2 \theta$ is.
 (a) 1 (b) $\frac{40}{9}$ (c) $\frac{38}{9}$ (d) $5\frac{1}{3}$
Ans. (d)
7. The area of a quadrant of a circle where the circumference of circle is 176 m, is
 (a) 2464 m^2 (b) 1232 m^2 (c) 616 m^2 (d) 308 m^2
Ans. (c)
8. For an event E, $P(E) + P(\bar{E}) = x$, then the value of $3x - 3$ is
 (a) -2 (b) 2 (c) 1 (d) -1
Ans. (a)
9. What is the greatest possible speed at which a girl can walk 95 m and 171 m in an exact number of minutes?
 (a) 17 m/min (b) 19 m/min (c) 23 m/min (d) 13 m/min
Ans. (b)

10. In figure the graph of a polynomial $P(x)$ is shown. The number of zeroes of $P(x)$ is



- Ans. (a) 1 (b) 2 (c) 3 (d) 4
(c)
11. Two lines are given to be parallel. The equation of one of the lines is $3x - 2y = 5$. The equation of the second line can be
(a) $9x + 8y = 7$ (b) $-12x - 8y = 7$ (c) $-12x + 8y = 7$ (d) $12x + 8y = 7$

- Ans. (c)
12. Three vertices of a parallelogram ABCD are $A(1,4)$, $B(-2,3)$ and $C(5,8)$. The ordinate of the fourth vertex D is :
(a) 8 (b) 9 (c) 7 (d) 6

- Ans. (b)
13. IN $\triangle ABC$ and $\triangle DEF$, $\angle F = \angle C$, $\angle B = \angle E$ and $AB = \frac{1}{2} DE$. Then the two triangles are
(a) Congruent, but not similar (b) Similar, but not congruent
(c) Neither congruent nor similar (d) Congruent as well as similar

- Ans. (b)
14. In $\triangle ABC$ right angled at B, $\sin A = \frac{7}{25}$, then the value of $\cos C$ is
(a) $\frac{7}{25}$ (b) $\frac{24}{25}$ (c) $\frac{7}{24}$ (d) $\frac{24}{7}$

- Ans. (a)
15. The minutes hand of a clock is 84 cm long. The distance covered by the tip of minute hand from 10: 10 am to 10:25 am is
(a) 44 cm (b) 88 cm (c) 132 cm (d) 176 cm

- Ans. (c)
16. The probability that the drawn card from a pack of 52 cards is neither an ace nor a spade is
(a) $\frac{9}{13}$ (b) $\frac{35}{52}$ (c) $\frac{10}{13}$ (d) $\frac{19}{26}$

- Ans. (a)
17. Three alarm clocks ring their alarms at regular intervals of 20 min, 25 min and 30 min respectively. If they first beep together at 12 noon, at what time will they beep again for the first time?
(a) 4 : 00 pm (b) 4 : 30 pm (c) 5 : 00 pm (d) 5 : 30 pm

- Ans. (c)
18. A quadratic polynomial the product and sum of whose zeroes are 5 and 8 respectively is
(a) $k[x^2 - 8x + 5]$ (b) $k[x^2 + 8x + 5]$ (c) $k[x^2 - 5x + 8]$ (d) $k[x^2 + 5x + 8]$

- Ans. (a)
19. Point A $(-1, y)$ and $B(5,7)$ lie on a circle with centre O $(2,-3y)$. The values of y are
(a) 1, -7 (b) -1,7 (c) 2,7 (d) -2,-7

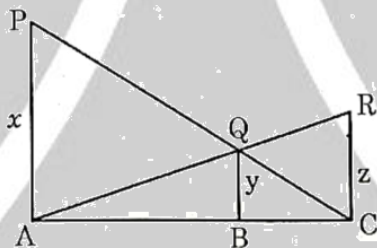
- Ans. (b)

20. Given that $\sec \theta = \sqrt{2}$, the value of $\frac{1 + \tan \theta}{\sin \theta}$ is
 (a) $2\sqrt{2}$ (b) $\sqrt{2}$ (c) $3\sqrt{2}$ (d) 2
Ans. (a)

SECTION – B

Q. No. 21 to 40 are of 1 mark each . Attempt any 16 from Q. 21 to 40 :

21. The greatest number which when divides 1251, 9377 and 15628 leaves remainder 1, 2 and 3 respectively is :
 (a) 575 (b) 450 (c) 750 (d) 625
Ans. (d)
22. Which of the following cannot be the probability of an event ?
 (a) 0.01 (b) 3% (c) $\frac{16}{17}$ (d) $\frac{17}{16}$
Ans. (d)
23. The diameter of a car wheel is 42 cm. The number of complete revolutions it will make in moving 132 km is :
 (a) 10^4 (b) 10^5 (c) 10^6 (d) 10^3
Ans. (b)
24. If θ is an acute angle and $\tan \theta + \cot \theta = 2$, then the value of $\sin^3 \theta + \cos^3 \theta$ is :
 (a) 1 (b) $\frac{1}{2}$ (c) $\frac{\sqrt{2}}{2}$ (d) $\sqrt{2}$
Ans. (c)
25. The ratio in which the line $3x + y - 9 = 0$ divides the line segment joining the points (1, 3) and (2, 7) is
 (a) 3 : 2 (b) 2 : 3 (c) 3 : 4 (d) 4 : 3
Ans. (c)
26. If $x-1$ is a factor of the polynomial $p(x) = x^3 + ax^2 + 2b$ and $a + b = 4$, then
 (a) $a = 5, b = -1$ (b) $a = 9, b = -5$ (c) $a = 7, b = -3$ (d) $a = 3, b = 1$
Ans. (b)
27. If a and b are two coprime numbers, then a^3 and b^3 are :
 (a) Coprime (b) Not coprime (c) Even (d) Odd
Ans. (a)
28. The area of a square that can be inscribed in a circle of area $\frac{1408}{7} \text{ cm}^2$ is
 (a) 321 cm^2 (b) 642 cm^2 (c) 128 cm^2 (d) 256 cm^2
Ans. (c)
29. If A (4, -2), B(7, -2) and C(7,9) are the vertices of a ΔABC , then ΔABC is :
 (a) equivalent triangle (b) isosceles triangle
 (c) right angled triangle (d) isosceles right angled triangle
Ans. (c)
30. If α, β are the zeros of the quadratic polynomial $p(x) = x^2 - (k + 6)x + 2(2k - 1)$, then the value of k , if $\alpha + \beta = \frac{1}{2} \alpha\beta$, is
 (a) -7 (b) 7 (c) -3 (d) 3
Ans. (b)

31. If n is a natural number, then $2(5^n + 6^n)$ always ends with :
 (a) 1 (b) 4 (c) 3 (d) 2
Ans. (d)
32. The line segment joining the points $P(-3, 2)$ and $Q(5, 7)$ is divided by the y -axis in the ratio :
 (a) 3 : 1 (b) 3 : 4 (c) 3 : 2 (d) 3 : 5
Ans. (d)
33. If $a \cot\theta + b \operatorname{cosec}\theta = p$ and $b \cot\theta + a \operatorname{cosec}\theta = q$, then $p^2 - q^2 =$
 (a) $a^2 - b^2$ (b) $b^2 - a^2$ (c) $a^2 + b^2$ (d) $b - a$
Ans. (b)
34. If the perimeter of a circle is half to that of a square, then the ratio of the area of the circle to the area of the square is
 (a) 22 : 7 (b) 11 : 7 (c) 7 : 11 (d) 7 : 22
Ans. (d)
35. A dice is rolled twice. The probability that 5 will not come up either time is
 (a) $\frac{11}{36}$ (b) $\frac{1}{3}$ (c) $\frac{13}{36}$ (d) $\frac{25}{36}$
Ans. (d)
36. The LCM of two numbers is 2400. Which of the following CANNOT be their HCF?
 (a) 300 (b) 400 (c) 500 (d) 600
Ans. (c)
37. In fig., PA , QB and RC are each perpendicular to AC . If $x = 8$ cm and $z = 6$ cm, then y is equal to

 (a) $\frac{36}{7}$ cm (b) $\frac{7}{56}$ (c) $\frac{25}{7}$ (d) $\frac{24}{7}$
Ans. (d)
38. In a $\triangle ABC$, $\angle A = x^\circ$, $\angle B = (3x - 2)^\circ$, $\angle C = y^\circ$. Also $\angle C - \angle B = 9^\circ$. The sum of the greatest and the smallest angles of this triangle is
 (a) 107° (b) 135° (c) 155° (d) 145°
Ans. (a)
39. If $\sec\theta + \tan\theta = p$, then $\tan\theta$ is
 (a) $\frac{p^2 + 1}{2p}$ (b) $\frac{p^2 - 1}{2p}$ (c) $\frac{p^2 - 1}{p^2 + 1}$ (d) $\frac{p^2 + 1}{p^2 - 1}$
Ans. (b)
40. The base BC of an equilateral $\triangle ABC$ lies on the y -axis. The co-ordinates of C are $(0, -3)$. If the origin is the mid-point of the base BC , what are the co-ordinates of A and B ?
 (a) $A(\sqrt{3}, 0)$, $B(0, 3)$ (b) $A(\pm 3\sqrt{3}, 0)$, $B(3, 0)$
 (c) $A(\pm 3\sqrt{3}, 0)$, $B(0, 3)$ (d) $A(-\sqrt{3}, 0)$, $B(3, 0)$
Ans. (c)

SECTION -C

Q. No. 41-45 are based on Case Study-I, you have to answer any (4) four questions. Q. No. 46-50 are based on Case Study-II, you have to answer any (4) four questions.

Case Study -I

A book store shopkeeper gives books on rent for reading. He has variety of books in his store related to fiction, stories and quizzes etc. He takes a fixed charge for the first two days and an additional charge for subsequent day. Amruta paid Rs.22 for a book and kept for 6 days; while Radhika paid Rs.16 for keeping the book for 4 days.

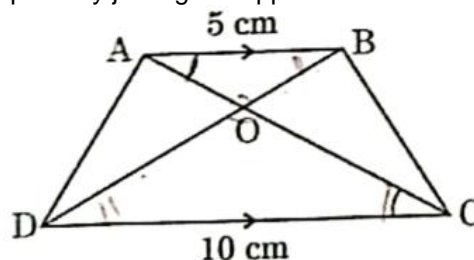


Assume that the fixed charge be Rs. x and additional charge (per day) be Rs. y . Based on the above information, answer any four of the following questions:

41. The situation of amount paid by Radhika, is algebraically represented by
 (a) $x - 4y = 16$ (b) $x + 4y = 16$ (c) $x - 2y = 16$ (d) $x + 2y = 16$
Ans. (d)
42. The situation of amount paid by Amruta, is algebraically represented by
 (a) $x - 2y = 11$ (b) $x - 2y = 22$ (c) $x + 4y = 22$ (d) $x - 4y = 11$
Ans. (c)
43. What are the fixed charges for a book?
 (a) Rs.9 (b) Rs.10 (c) Rs.13 (d) Rs.15
Ans. (b)
44. What are the additional charges for each subsequent day for a book?
 (a) Rs.6 (b) Rs.5 (c) Rs.4 (d) Rs.3
Ans. (d)
45. What is the total amount paid by both, if both of them have kept the book for 2 more days?
 (a) Rs.35 (b) Rs.52 (c) Rs.50 (d) Rs.58
Ans. (c)

Case Study -II

A farmer has a field in the shape of trapezium, whose map with scale 1 cm = 20 m, is given below: The field is divided into four parts by joining the opposite vertices.



Based on the above information, answer any four of the following questions:

46. The two triangular regions AOB and COD are

- (a) Similar by AA criterion (b) Similar by SAS criterion
(c) Similar by RHS criterion (d) Not similar

Ans. (a)

47. The ratio of the area of the $\triangle AOB$ to the area of $\triangle COD$ is

- (a) 4 : 1 (b) 1 : 4 (c) 1 : 2 (d) 2 : 1

Ans. (b)

48. If the ratio of the perimeter of $\triangle AOB$ to the perimeter of $\triangle COD$ would have been 1 : 4 then

- (a) $AB = 2 CD$ (b) $AB = 4 CD$ (c) $CD = 2 AB$ (d) $CD = 4 AB$

Ans. (d)

49. If in $\triangle AOD$ and $\triangle BOC$, $\frac{AO}{BO} = \frac{AD}{BO} = \frac{OD}{OC}$ then

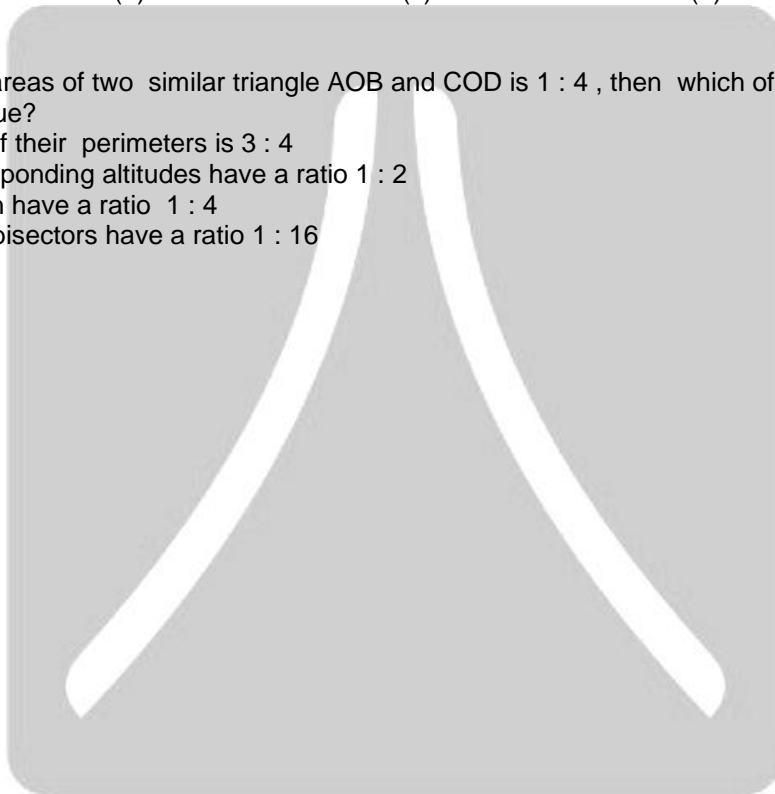
- (a) $\triangle AOD \sim \triangle BOC$ (b) $\triangle AOD \sim \triangle BCO$ (c) $\triangle ADO \sim \triangle BCO$ (d) $\triangle ODA \sim \triangle OBC$

Ans. (b)

50. If the ratio of areas of two similar triangle AOB and COD is 1 : 4, then which of the following statement is true?

- (a) The ratio of their perimeters is 3 : 4
(b) The corresponding altitudes have a ratio 1 : 2
(c) The median have a ratio 1 : 4
(d) The angle bisectors have a ratio 1 : 16

Ans. (b)



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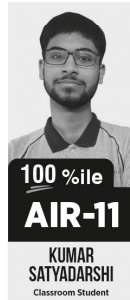
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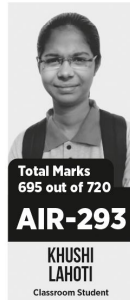
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