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SSLC MODEL EXAMINATION

MATHEMATICS [English Version]

Time allowed: 2½ Hours]

[Maximum Marks: 100

- Instructions:** (1) Check the question paper for fairness printing. If there is any lack of fairness, inform the Hall Supervisor immediately.
 (2) Use Black or Blue ink to write and pencil to draw diagrams.
Note: This question paper contains four sections.

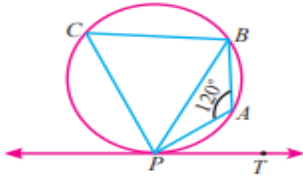
SECTION – I (Marks 15)

- Note:** (i) Answer all the 15 questions.
 (ii) Choose the correct answer from the given four alternatives and write the option code and the corresponding answer. 15 x 1 =15

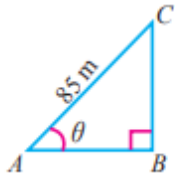
- If $f(x) = x^2 + 5$, then $f(-4) =$
 (1) -20 (2) 20 (3) 21 (4) 26
- The 9th term of the sequence 1, 1, 2,3,5,8, is
 (1) 21 (2) 23 (3) 34 (4) 55
- If $x \neq 0$, then $1 + \sec x + \sec^2 x + \sec^3 x + \sec^4 x + \sec^5 x$ is equal to
 (1) $(1 + \sec x)(1 + \sec^3 x + \sec^4 x)$ (2) $(1 - \sec x)(\sec x + \sec^3 x + \sec^5 x)$
 (3) $(1 + \sec x)(1 + \sec^2 x + \sec^4 x)$ (4) $(1 + \sec x)(\sec^2 x + \sec^3 x + \sec^4 x)$
- If the system $6x - 2y = 3$, $kx - y = 2$ has a unique solution, then
 (1) $k \neq 4$ (2) $k = 4$ (3) $k \neq 3$ (4) $k = 3$
- A quadratic equation whose one root is 2 is
 (1) $x^2 - 5x - 6 = 0$ (2) $x^2 - 5x + 6 = 0$ (3) $x^2 + 6x - 5 = 0$ (4) $x^2 - 6x - 5 = 0$
- If $A = \begin{pmatrix} \alpha & \beta \\ \gamma & -\alpha \end{pmatrix}$ is such that $A^2 = I$, then
 (1) $1 + \alpha^2 - \beta\gamma = 0$ (2) $1 - \alpha^2 - \beta\gamma = 0$ (3) $1 - \alpha^2 + \beta\gamma = 0$ (4) $1 + \alpha^2 + \beta\gamma = 0$
- The slope of the straight line $7y - 2x = 11$ is equal to
 (1) $-\frac{2}{7}$ (2) $\frac{2}{7}$ (3) $\frac{7}{2}$ (4) $-\frac{7}{2}$
- If a straight line $y = 2x + k$ passes through the point (2, 2), then the value of k is equal to
 (1) 0 (2) 4 (3) 2 (4) -2
- If a vertical stick 12m long casts a shadow 8m long on the ground and at the same time a tower casts a shadow 40 m long on the ground, then the height of the tower is
 (1) 60m (2) 75 m (3) 50 m (4) 40 m



10. In the figure, if $\angle PAB = 120^\circ$ then $\angle BPT =$



- (1) 60° (2) 40° (3) 30° (4) 120°
11. $19\tan^2 \theta - 19 \sec^2 \theta =$
 (1) 1 (2) 0 (3) -19 (4) 19
12. In the adjoining figure, $\sin \theta = \frac{15}{17}$. Then BC =



- (1) 75 m (2) 95 m (3) 65 m (4) 85 m
13. If the volume of a sphere is $\frac{9}{16}\pi$ cu. Cm, then its radius is
 (1) $\frac{2}{3}$ cm (2) $\frac{3}{2}$ cm (3) $\frac{3}{4}$ cm (4) $\frac{4}{3}$ cm
14. If t is the standard deviation of x, y, z , then the standard deviation of $x - 5, y - 5, z - 5$ is
 (1) $x y z$ (2) $t - 5$ (3) t (4) $\frac{t}{3}$
15. If A and B are mutually exclusive events and S is the sample space such that $P(A) = \frac{1}{3} P(B)$ and $S = A \cup B$, then $P(A) =$
 (1) $\frac{3}{8}$ (2) $\frac{3}{4}$ (3) $\frac{1}{2}$ (4) $\frac{1}{4}$

SECTION – II
(Marks 20)

Note: (i) Answer 10 questions.
(ii) Question No. 30 is Compulsory. Choose any 9 questions from first 14 questions. 10 x 2 = 20

16. Given $A = \{a, x, y, r, s\}$, $B = \{1, 3, 5, 7, -10\}$, verify the commutative property of set union.
17. For the given function $F = \{(1,3), (2,5), (4,7), (5,9), (3,1)\}$. Write the domain and range.
18. If a clock strikes once at 1 o' clock, twice at 2 o' clock and so on, how many times will it strike in a day?
19. Find the square root of: $x^2 + 4(x + 2) - 4$

20. If $A = \begin{bmatrix} o & c & b \\ c & o & a \\ b & a & o \end{bmatrix}$ then find A^2 .

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21. Solve: $\begin{pmatrix} 3 & 2 \\ 4 & 5 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 8 \\ 13 \end{pmatrix}$

22. Find the equation of the straight line whose slope is $\frac{2}{3}$ and passing through $(5, -4)$

23. Show that the straight lines $3x - 5y + 7 = 0$ and $15x + 9y + 4 = 0$ are perpendicular.
24. State Pythagoras theorem.
25. Prove the identity $(\sin^6 \theta + \cos^6 \theta) = 1 - 3\sin^2 \theta \cos^2 \theta$
26. A simple pendulum of length 40 cm subtends 60° at the vertex in one full oscillation. What will be the shortest distance between the initial position and the final position of the bob? (between the extreme ends)
27. The radii of two right circular cylinders are in the ratio of 3:2 and their heights are in the ratio 5:3. Find the ratio of their curved surface areas.
28. The largest value in a collection of data is 7.44. If the range is 2.26, then find the smallest value in the collection.
29. A letter is chosen at random from the letters of the word "ENTERTAINMENT". Find the probability that the chosen letter is a vowel or T. (repetition of letters is allowed)
30. (a) A right angled ΔABC with sides 5cm, 12cm, and 13cm is revolved about the fixed side of 12cm. Find the volume of the solid generated.

(OR)

(b) Divide: $\frac{x^3 - 1}{x + 3}$ by $\frac{x^2 + x + 1}{3x + 9}$

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SECTION – III
(Marks 45)

Note: (i) Answer 9 questions:

(ii) Question No. 45 is Compulsory. Select any 8 questions from the first 14 questions. 9 x 5 = 45

31. In a group of students, 65 play foot ball, 45 play hockey, 42 play cricket, 20 play foot ball and hockey, 25 play foot ball and cricket, 15 play hockey and cricket and 8 play all the three games. Find the number of students in the group. (Assume that each student in the group plays atleast one game)
32. Let $A = \{6, 9, 15, 18, 21\}$; $B = \{1, 2, 4, 5, 6\}$ and $f: A \rightarrow B$ be defined by $f(x) = \frac{x-3}{3}$. Represent f by
(i) an arrow diagram (ii) a set of ordered pairs (iii) a table (iv) a graph
33. Find the sum of n terms of the series $8 + 88 + 888 + \dots$
34. Factorize: $x^3 - 23x^2 + 142x - 120$
35. If the roots of the equation $(a^2 + b^2)x^2 - 2(ac + bd)x + c^2 + d^2 = 0$, where a, b, c and $d \neq 0$, are equal ,
prove that $\frac{a}{b} = \frac{c}{d}$
36. If $A = \begin{pmatrix} 1 & -1 \\ 2 & 3 \end{pmatrix}$ then show that $A^2 - 4A + 5I_2 = O$
37. The vertices of ΔABC are $A(1,8)$, $B(-2,4)$, $C(8,-5)$. If M and N are the midpoints of AB and AC respectively, find the slope of MN and hence verify that MN is parallel to BC.
38. ABCD is a quadrilateral with AB parallel to CD. A line drawn parallel to AB meets AD at P and BC at Q.
Prove that $\frac{AP}{PD} = \frac{BQ}{QC}$
39. Prove : $\frac{\sin \theta - \cos \theta + 1}{\sin \theta + \cos \theta - 1} = \frac{1}{\sec \theta - \tan \theta}$
40. Let O and C be the centre of the base and the vertex of a right circular cone. Let B be any point on the circumference of the base. If the radius of the cone is 6cm and if $\angle OBC = 60^\circ$, then find the height and curved surface area of the cone.
41. Find the coordinates of the foot of the perpendicular from the origin on the straight line $3x + 2y = 13$.
42. Using clay, a student made a right circular cone of height 44 cm and base radius 11 cm. Another student reshapes it in the form of a sphere. Find the radius of the sphere.

43. Prove that the standard deviation of the first n natural numbers is $\sigma = \sqrt{\frac{n^2 - 1}{12}}$

44. In a class, 40% of the students participated in Mathematics – quiz , 30% in Science quiz and 10% in both the quiz programmes. If a student is selected at random from the class, find the probability that the students participated in Mathematics or Science or both quiz programmes.

45. (a) Solve the equation $a^2x^2 - 3abx + 2b^2 = 0$ by completing the square.

(OR)

(b) In the geometric series $2+ 4+8+.....$, starting from the first term how many consecutive terms are needed to yield the sum 1022?

SECTION – IV

(Marks 20)

Note: Answer both the questions choosing either of the alternatives:

2 x 10 = 20

46.(a) Draw the two tangents from a point which is 10cm away from the centre of a circle of diameter 12cm. Also, measure the lengths of the tangents.

(OR)

(b) Construct a cyclic quadrilateral PQRS with PQ = 6.5 cm, QR = 5.5 cm, PR =7cm and PS = 4.5 cm

47. (a) Draw the graph of $y = 2x^2+x-6$ and hence solve $2x^2 + x -10 = 0$

(OR)

(b) A bus travel at a speed of 40 km/hr. Write the distance – time formula and draw the graph of it. Hence , find the distance travelled in 3 hours.

ALL THE BEST

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