K.S.E.E.B., Malleshwaram, Bangalore
SSLC Model Question Paper-2 (2015)
MATHEMATICS

Max Marks: 80   Time: 2 Hours 45 minutes

No. of Questions: 40   Code No. : 81E

Four alternatives are given for the each question. Choose the correct alternative and write the complete answer along with its alphabet in the space provided.   **1 mark × 8 = 8**

1. $(1 + \cos\theta)(1 - \cos\theta)$ is equal to

    (a) $\sin^2\theta$ (b) $\tan^2\theta$

    (c) 1   (d) 0

2. If $P = \{2, 3, 4\}$ and $Q = \{3, 5, 7\}$ then P/Q is equal to

    (a) {3, 7}   (b) {2, 4}

    (c) {3}   (d) {2, 4, 3, 7}

3. If $nP_2 = 90$ then n is equal to

    (a) 90   (b) 45

    (c) 20   (d) 10

4. If $x = 1$ is a zero of the polynomial $f(x) = x^3 - 2x^2 + 4x + K$ then the value of K is

    (a) −3   (b) 3

    (c) 4   (d) −4

5. $\sin A . \cos A . \tan A + \cos A . \sin A . \cot A$ is equal to
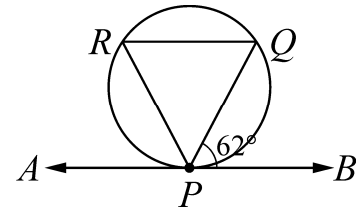
    (a) $\sin^2 A - \cos^2 A$ (b) $\tan^2 A + \cot^2 A$

    (c) $\sin^2 A + \cos^2 A$ (d) $\sin^2 A + \tan^2 A$

6. In the given figure, *APB* is tangent to the circle at the point *P* on the circle. *PQ* is a chord. If ∠*BPQ* = 62° then ∠*PRQ* =

   (a) 28°

   (b) 118°

   (c) 124°

   (d) 62°

7. If 1 + 2 + 3 + ……… *n* = 78 then the value of *n* is,

   (a) 13

   (b) 12

   (c) 11

   (d) 16

8. The product of $\sqrt[3]{2}$ and $\sqrt{2}$ is

   (a) $\sqrt[6]{72}$

   (b) $\sqrt[6]{24}$

   (c) $\sqrt[6]{16}$

   (d) $\sqrt[6]{4}$

II   **1 mark × 6 = 6**

9. Using Euclid's division algorithm, find the HCF of 65 and 117.

10. A die is rolled. Find the probability of getting a square number.

11. Using Euler's formula verify:

    N = 6, R = 6, A = 10.

12. Verify Euler's formula for a Hexahedron.

13. The height of a right circular cylinder is 14 cm, and the radius of its base is 2 cm. Find its curved surface area.

14. Find sin θ and cos θ using the following figure, if *AB* = 24 units, *AC* = 25 units and *BC* = 7 units.
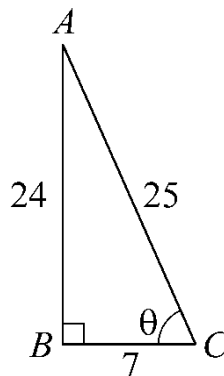
III   **2 marks × 16 = 32**

15. Prove that $\sqrt{3} + \sqrt{2}$ is an irrational number.

16. If U = {4, 8, 12, 16, 20, 24, 28}, A = {8, 16, 24}, and B = {4, 16, 20, 28} verify that $(A \cup B)' = A' \cap B'$.

17. The arithmetic mean of two numbers is 17 and their geometric mean is 15. Find the numbers.

18. The first term of a G.P. is 50 and the fourth term is 1350. Find its fifth term.

19. How many 3-digit numbers can be formed using the digits 1, 2, 3, 4, 5 and 6 without repeating any digit? How many of these are even numbers.

20. If $nP_r = 336$ and $nC_r = 56$ find n and r.

21. There are 6 red, 7 white and 7 black balls in a basket. Two balls are drawn at random. Find the probability that the balls are red or both the balls are black.

22. Performance of two players is given below:

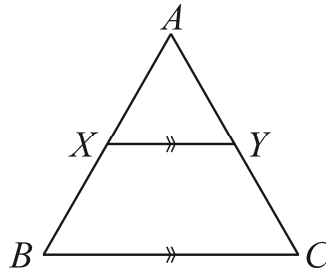| Player	Mean	SD
Arun	70	4.2
Bharath	60	3.0

Who is more consistent in performance?

23. Draw a pie chart for the following data:

Particulars	Hostel fee	College fee	Miscellaneous
Amount (Rs.)	360	120	60

24. Find the value of p so that the equation $4x^2 - 8px + 9 = 0$ has roots whose difference is 4.

25. In $\triangle ABC$. $XY \parallel BC$ and XY divides the triangle into two parts of equal area. Find $BX : AB$. [Hint: $\triangle ABC = 2\triangle AXY$]

26. In the given figure:
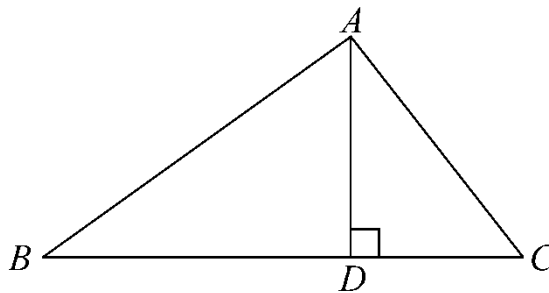
$AD \perp BC$. Prove that $AB^2 + CD^2 = BD^2 + AC^2$.

27. $ABCD$ is a square. F is the midpoint of AB. BE is one third of BC. If the area of $\triangle FBE$ is 108 cm^2. Find the length of AC.

28. The line passing through the points (2, 7) and (3, 6) and parallel to a line joining (9, a) and (11, 3). Find a.

29. Find the co-ordinates of the midpoint of the line joining the points (−3, 10) and (6, −8).

30. Construct a pair of tangents to a circle of radius 3.5 cm from a point 3.5 cm away from the circle. Measure the length of the tangent.

IV   **3 marks × 6 = 18**

31. The third term of an A.P. is 8 and the ninth term exceeds three times the third term by 2. Find the sum of its first 19 terms.

OR

In a H.P. $T_4 = \dfrac{1}{11}$ and $T_{14} = \dfrac{3}{23}$ find T_{19}.

32. If $\left(x^3 + ax^2 - bx + 10\right)$ is divisible by $x^2 - 3x + 2$ find the values of a and b.

OR

Using the remainder theorem find the remainder when $P(x) = x^3 + 3x^2 - 5x + 8$ is divided by $g(x) = x - 3$. Verify the result by actual division.

33. The age of a man is twice the square of the age of his son. Eight year hence the age of the man will be 4 years more than three times the age of his son. Find their present age.

OR

Solve by completing the square $2x^2 + 5x - 3 = 0$.

34. Prove that $\sqrt{\dfrac{1 + \sin\theta}{1 - \sin\theta}} + \sqrt{\dfrac{1 - \sin\theta}{1 + \sin\theta}} = 2\sec\theta$.

OR

Prove that $\sin^2 30° \cos^2 45° + 4\tan^2 30° + \dfrac{1}{2}\sin^2 90° + \dfrac{1}{8}\cot^2 60° = 2$.

35. Simplify: $\dfrac{7\sqrt{3}}{\sqrt{10} - \sqrt{3}} - \dfrac{2\sqrt{5}}{\sqrt{6} + 2}$.

36. The tangents drawn from an external point to a circle (i) are equal, (ii) subtend equal angles at the centre.

V   **4 marks × 4 = 16**

37. From the top of a cone of base radius 24 cm and height 45 cm, a cone of slant height 17 cm is cutoff. What is the volume of the remaining frusturn of the cone?

<div align="center">OR</div>

    (a) The radii of two right circular cylinders are in the ratio 2 : 3 and the ratio of their curved surface area is 5 : 6. Find the ratio of their heights.

    (b) A right circular cone is of height 3.6 cm and radius of its base is 1.6 cm. It is melted and recast into a right circular cone with radius of its base 1.2 cm. Find the height of the cone so formed.

38. State and prove basic proportionality theorem.

39. Solve graphically $x^2 - 3x - 10 = 0$.

40. Construct a transverse common tangent to two circles of radii 3 cm and 2 cm with their centres 9 cm apart. Measure the length of the tangent and verify.

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