## Mock Test 08: Complete Syllabus (Standard Maths)-041

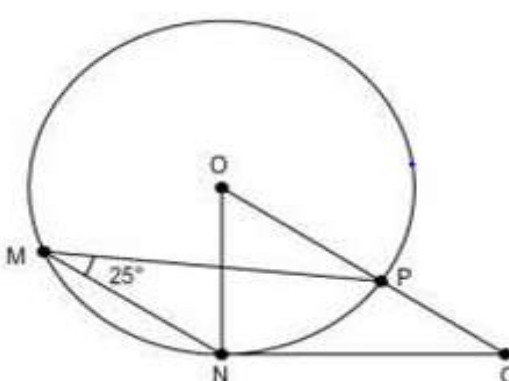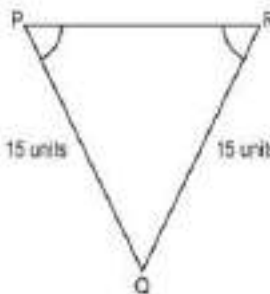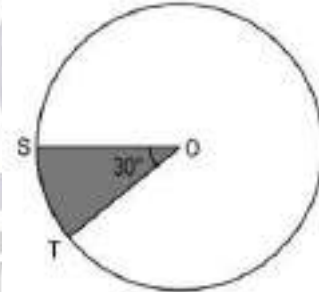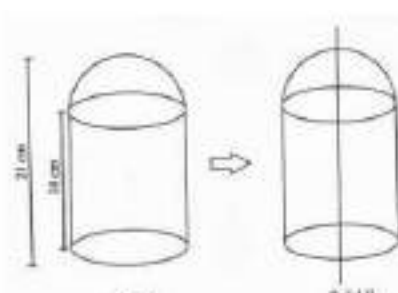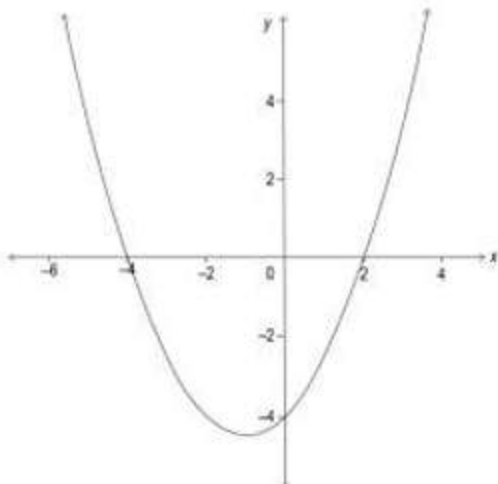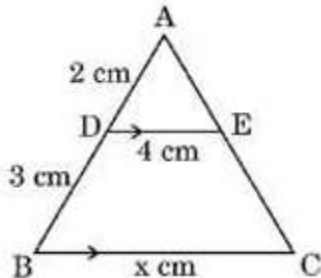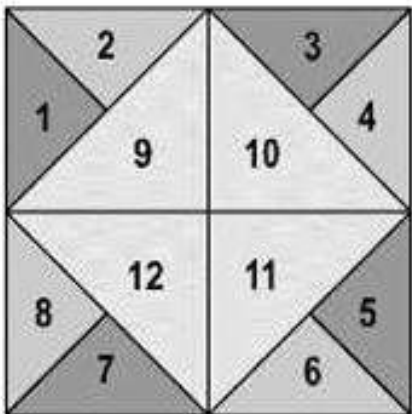**Time: 3 Hrs**      **Maximum marks : 80**
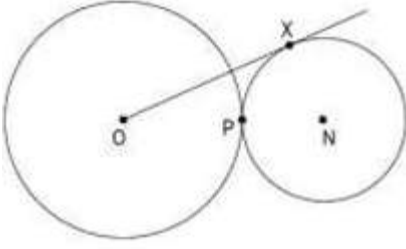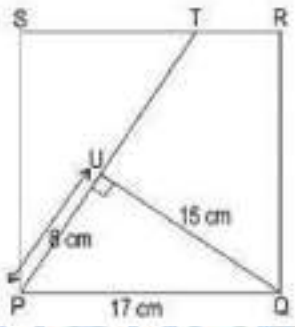
## INSTRUCTIONS TO THE STUDENTS

1. This question paper has 5 sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 2 marks each.
4. Section C has 6 questions carrying 3 marks each.
5. Section D has 4 questions carrying 5 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each.
7. All questions are compulsory. However, an internal choice in 2 questions of 2 marks, 2 questions of 3 marks and 2 question of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.

## SECTION A
### ( Questions 1 – 10 carry 1 marks )

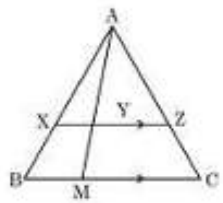| | | |
|---|---|---|
| **1** | Which of the following is an irrational number : <br> (a) $5\sqrt{4}$      (b) $\frac{\sqrt{2}}{\sqrt{8}}$      (c) $6+\sqrt{5}$      (d) $\sqrt{64} - \sqrt{4}$ | **1** |
| **2** | CF is a median of △ABC with vertices A(5,–6),B(6,4)and C(0,0). Length CF is equal to : <br> (a) $\sqrt{68}$      (b) $2\sqrt{15}$      (c) $\frac{5\sqrt{5}}{2}$      (d) $\frac{7\sqrt{5}}{2}$ | **1** |
| **3** | Harsh correctly solved a pair of linear equations in two variables and found their only point of intersection as (3, -2). One of the lines was x - y = 5. Which of the following could have been the other line? <br> (i) $3x - 3y = 15$      (ii) $2x - 3y = 12$      (iii) $2x - 3y = 14$ <br> (a) only (i)                 (b) only (ii) <br> (c)only (i) and (ii)            (d) only (ii) and (iii) | **1** |
| **4** | Shown below is a circle with centre O. NQ is a tangent to the circle. The measure of ∠OQN will be: <br><br>  <br><br> (a) 40°      (b) 50°      (c) 55°      (d) 65° | **1** |

| 5 | In the figure given below , if 5sinp = 4 , then length of PR will be : | 1 |
|---|---|---|



(a) 6 units        (b) 8 units        (c) 15 units    (d) 18 units

| 6 | In the quadratic equation $6x^2 - gx + 2 = 0$, if the sum of the roots is equal to three times their product then the value of $g$ will be : | 1 |
|---|---|---|

(a) −6        (b) 1        (c) $\frac{-1}{6}$        (d) 6

| 7 | Shown below is the circle with centre o, where $\angle SOT=30°$.The area of minor sector SOT is 7 cm$^2$ . The area of circle is | 1 |
|---|---|---|



(a) $84\,\pi$cm$^2$    (b) 84 cm$^2$    (c) $\frac{84}{11}$    (d) $\frac{\sqrt{84}}{\sqrt{\pi}}$

| 8 | A number is chosen from the numbers 1, 2, 3 and denoted as x, and a number is chosen from the numbers 1, 5, 7 and denoted as y. then p(xy < 15) is | 1 |
|---|---|---|

(a) $\frac{1}{9}$    (b) $\frac{3}{9}$    (c) $\frac{5}{9}$    (d) $\frac{7}{9}$

| 9 | If cos θ =12 /13 , then value of 5cosec θ – 4tan θ is : | 1 |
|---|---|---|

(A) (a) $\frac{10}{39}$    (b) $\frac{131}{60}$    (c) $\frac{31}{3}$    (d) $\frac{34}{3}$

| 10 | If the prime factorisation of a natural number $k$ $is$ $(3 \times 5 \times p)$ where $p \neq 2$ , then the prime factorisation of $10\,k^2$ will be : | 1 |
|---|---|---|

(A) $2 \times 3^2 \times 5^3 \times p^2$        (b) $2^2 \times 3^2 \times 5^2 \times p^2$

(c) $3^2 \times 5^2 \times p^2$        (d) $3^2 \times 5^3 \times p^2$

| 11 | A solid is made using a cylinder and a hemisphere. It is then dipped in red paint and cut vertically along the axis of symmetry as shown below (solid II) .The unpainted surface of solid after vertical cut is : | 1 |
|---|---|---|



(a) 350 cm$^2$    (b) 196 cm$^2$    (c) 273 cm$^2$    (d) 546 cm$^2$

| 12 | The figure below shows the graph of a quadratic polynomial p(x). | 1 |
|---|---|---|
| |  | |
| | (a) $(x-2)(x+4)$ $\qquad\qquad$ (b) $(x+2)(x-4)$ | |
| | (c) $\frac{1}{2}(x+2)(x-4)$ $\qquad\qquad$ (d) $\frac{1}{2}(x-2)(x+4)$ | |
| 13 | OAB is a sector of a circle with centre O and radius 7 cm .If length of arc AB =22/3 cm , then ∠AOB is equal to : | 1 |
| | (a)$\left(\frac{120}{7}\right)^{o}$ $\qquad$ (b) (45)° $\qquad$ (c) (60)° $\qquad$ (d) (30)° | |
| 14 | In the given figure, DE‖ BC, the value of x is : | 1 |
| |  | |
| | (a) 6 $\qquad$ (b) 8 $\qquad$ (c) 10 $\qquad$ (d) 12.5 | |
| 15 | A square dartboard has sections numbered from 1 to 12 as shown below. Cathy will win if dart lands on a factor of 12. | 1 |
| |  | |
| | The probability that Cathy wins is : | |
| | (a) $\frac{5}{12}$ $\qquad$ (b) $\frac{6}{16}$ $\qquad$ (c) $\frac{6}{12}$ $\qquad$ (d) $\frac{7}{16}$ | |
| 16 | The area of the triangle formed by the line $\frac{x}{a}+\frac{y}{b}$ =1 with the coordinate axes is: | 1 |
| | (a) ab $\qquad$ (b) $\frac{1}{2}$ ab $\qquad$ (c) $\frac{1}{4}$ ab $\qquad$ (d) 2 ab | |
| 17 | In a frequency distribution, the mid-value of a class is 10 and the width of the class is 6. The lower limit of the class is : | 1 |
| | (a) 6 $\qquad$ (b) 7 $\qquad$ (c) 8 $\qquad$ (d) 12 | |

| 18 | Two circles with centres O and N touch each other at point P as shown. O, P and N are collinear. The radius of the circle with centre O is twice that of the circle with centre N. OX is a tangent to the circle with centre N, and OX = 18 cm. | 1 |
|---|---|---|



The radius of the circle with centre N is :

(a) $\frac{9}{\sqrt{2}} \, cm$      (b) 9 cm      (c) $\frac{18}{\sqrt{2}}$      (d) $\frac{18}{\sqrt{10}}$

Questions number 19 and 20 are Assertion and Reason based questions. Two statements are given, one labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

| 19 | **Assertion (A) :** Product of two numbers is 5780 and their HCF is 17, then their LCM is 340.<br>**Reason (R) :** For any two positive integers a and b , HCF (a ,b) + LCM (a ,b) = a × b | 1 |
|---|---|---|
| 20 | **Assertion (A) :** In the given figure, PQRS is a square and sine of angle SPT = $\frac{8}{17}$ | 1 |



**Reason (R) :** Triangle PST is similar to triangle QUP .

## SECTION B
### ( Questions 21 – 25 carry 2 marks )

| 21 | (a) The 9th term of an AP is equal to 6 times its second term. If the fifth term is 22, find the AP.<br><div align="center">**OR**</div><br>(b) Find the middle term(s) of the AP 213, 205 ,197, …………, 37. | 2 |
|---|---|---|
| 22 | If cos(15°+x+y)=sin30° and tan(25°+x)=cot30° , find the value of x and y | 2 |
| 23 | In the given figure, XZ is parallel to BC. AZ = 3 cm, ZC = 2 cm, BM = 3 cm and MC = 5 cm. Find the length of XY. | 2 |

| 24 | (a)If a chord of a circle of diameter 40 cm subtends an angle of 90° at the centre of the circle, find the area of the corresponding minor segment of the circle. (Use π= 3·14). | 2 |
|---|---|---|

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

(b)In the given figure, two concentric circles with centre O have radii 21 cm and 42 cm. If ∠AOB = 60° , find the area of the shaded region.



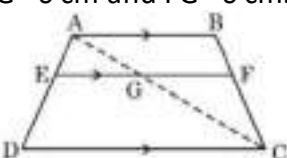| 25 | Prove that a rectangle circumscribing a circle is a square. | 2 |
|---|---|---|

# SECTION C
## ( Questions 26 – 31 carry 3 marks )

| 26 | Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact. | 3 |
|---|---|---|
| 27 | Prove that $3+5\sqrt{2}$ is an irrational number, given that √2 is an irrational number. | |
| 28 | If α ,β are zeroes of the quadratic polynomial $x^2 + 9x + 20$, form a quadratic polynomial whose zeroes are ( α+ 1) and ( β+ 1). | 3 |
| 29 | (a)Evaluate : $\dfrac{\sin 30° + \tan 45° - \csc 60°}{\sec 30° + \cos 60° + \cot 45°}$ | 3 |

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

(b) In Δ PAT , right angled at A , AT = 8 cm and PT − PA = 2 cm . Determine the values of sin P and cos P.

| 30 | A box contains balls bearing numbers 57, 58, 59, ……., 77. A ball is drawn at random from the box. Find the probability that the number on the ball is – <br>(i) a prime number. <br>(ii) not divisible by 2. | 3 |
|---|---|---|
| 31 | (a)A 2-digit number is obtained by either multiplying the sum of the digits by 7 and then adding 3 or by multiplying the difference of the digits by 19 and then subtracting 1. It is given that the digit at ten's place is greater than that of unit's place. Find the 2-digit number. | 3 |

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

(b)Using graphical method , solve the following system of equations : $3x−y+4=0$ and $3x+y+2=0$

# SECTION D
## ( Questions 32 – 38 carry 4 marks )

| 32 | Find the value(s) of p for which the quadratic equation given as $(p+4)^2−(p+1)x+1=0$ has real and equal roots. Also, find the roots of the equation(s) so obtained. | 5 |
|---|---|---|
| 33 | State the converse of basic proportionality theorem. Also find $\dfrac{BF}{FC}$ in the following figure, given that AB∥DC ∥EF and $\dfrac{AE}{ED} = \dfrac{2}{3}$. <br>Also, find the length of AB and CD if EG= 6 cm and FG= 6 cm. <br><br> | 3 + 2 |
| 34 | (a)From one of the faces of a solid wooden cube of side 14 cm, maximum number of cylinders of diameter 2.8 cm and height 7 cm are scooped out. Find the total number of cylinders that can be scooped out. Also, find the total surface area of the remaining solid. | 5 |

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

(b) From a solid cylinder of height 24 cm and radius 5 cm, one cone of height 12 cm radius 5 cm and one hemisphere of radius 5 cm are hollowed out .Find the volume and surface area of the remaining solid.

| 35 | (a)The following distribution shows the daily pocket allowance of children of a locality. The mean daily pocket allowance is ₹ 36.10. Find the missing frequency, f. | 5 |
|---|---|---|

| Daily pocket allowance (in ₹) | 20 – 25 | 25-30 | 30-35 | 35-40 | 40-45 | 45-50 | 50-55 |
|---|---|---|---|---|---|---|---|
| Number of children | 7 | 6 | 9 | 13 | f | 5 | 4 |

Also find median daily pocket allowance if modal daily pocket allowance is ₹ 33.1

**OR**

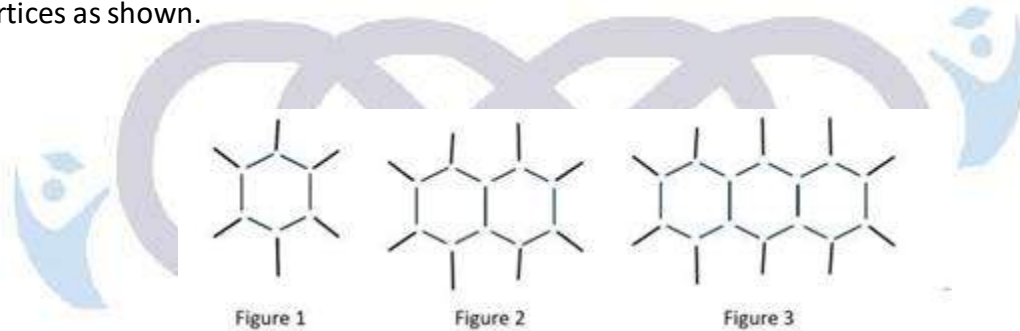(b)The mode of the following frequency distribution is 55. Find the missing frequencies 'x' and 'y'.

| Class Interval | 0-15 | 15-30 | 30-45 | 45-60 | 60-75 | 75-90 | Total |
|---|---|---|---|---|---|---|---|
| Frequency | 6 | 7 | X | 15 | 10 | y | 51 |

## SECTION E
### ( Questions 36 – 35 carry 5 marks )

| 36 | **Case Study – 1** | 1 + 1 + 2 |
|---|---|---|

While playing with straws Charlie made a pattern. He used straws to make hexagons and at vertices as shown.
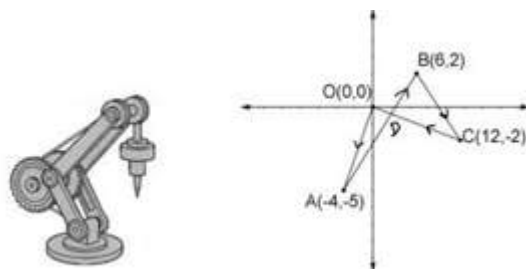


Figure 1     Figure 2     Figure 3

Based on the above given information, answer the following questions :
(i)Find number of straws used in Figure 5.
(ii)In which figure Charlie used 96 straws for hexagons.
(ii)(a) How many more straws are there from 7th figure to 11th figure than in first 3 figures?

**OR**

(b) Find the difference between number of straws used for hexagons and number of straws used at the vertices, if Charlie made 20 figures .
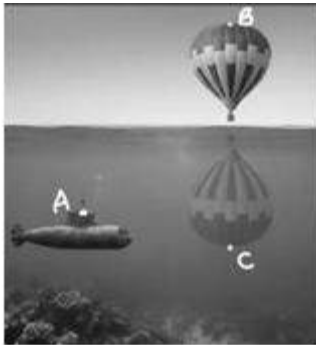
| 37 | Allan and Ethan built a robot that can paint a path as it moves on a graph paper. Some co ordinate of points are marked on it. It starts from (0, 0), moves to the points listed in order (in straight lines) and ends at (0, 0). | 1 + 1 + 2 |
|---|---|---|



Allan entered the points A(-4, -5), B(6, 2) and C( 12, -2) in order. The path drawn by robot is shown in the figure.
Based on the above , answer the following questions :
(i)Determine the distance OA.
(ii) AB is represented by equation $7x -10y = 22$ . Find its point of intersection with $x$ – axis .

| | | |
|---|---|---|
| | (iii) (a) Find the ratio in which OC is divided by line $7x - 10y = 22$ . <br> **OR** <br> (b) Using distance formula find the value of $\frac{BC}{OC}$ . | |
| 38 | **Case Study – 3** <br> Captain Alex is commanding a submarine performing a drill beneath a calm ocean, when he notices a toy hot air balloon. <br> From his observation point A, which is 100 m , below the surface of the water: <br> • He measures the angle of elevation of the hot air balloon (Point B) as 60°. <br> • He immediately notices the balloon's reflection directly below it in the water, and measures the angle of depression of the reflection (Point C) as 30°. <br><br>  <br><br> Based on the above given information, answer the following questions : <br> (i)Represent the above situation with the help of a diagram. <br> (ii) Frame the equation to find horizontal distance between point A and vertical line joining points B and C. <br> (iii) (a) Find the distance of point B from the water surface? <br> **OR** <br> (b) Find the distance of point C from the water surface? | 2 + 1 + 1 |

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