

--	--	--	--	--	--

Roll No.

Date:

NORTHWEST ACCREDITATION COMMISSION, USA
GRADE 10TH (Secondary)
Subject- Mathematics
Subject Code – M202

Question Paper No. :

Question Paper code:

Important Instructions

1. OPENING AND CHECKING OF THE QUESTION-BOOKLET

Break open the seal of the Question-Booklet only when the announcement is made by the Invigilator. After breaking the seal and before attempting the questions, student should immediately check for:

- a) The number of the printed page in the Question-Booklet is the same as mentioned on the cover page of the Booklet and
- b) Any printing error in the Booklet pages, if any.

Any discrepancy or error should be brought to the notice of the Invigilator who will then replace the Booklet. No additional time will be given for this.

- 2.** No student, without the permission of the Superintendent, or the Invigilator concerned, is to leave his/her seat or the Examination Room.

3. FILLING UP THE REQUIRED INFORMATION ON QUESTION-BOOKLET AND ANSWER SHEET

After breaking open the seal and checking the Booklet, student should:

- a) Fill up the **Question Paper No. and Question Paper Code** (mentioned on the cover of Question-Booklet) in the space provided on the First Answer Sheet.
- b) Fill up his/her Roll Number on the First Answer Sheet and on each Supplementary Answer Sheet, if taken.
- c) Student should mention the total number of **Supplementary Answer Sheet**, if taken, in the space provided on the First Answer Sheet and also fill up the Serial Number mentioned on each **Supplementary Answer Sheet** along with his/her Roll Number in the register maintained by the Invigilator. Student must tie all the Answer Sheets with the thread provided by the Invigilator.

4. INSTRUCTIONS ABOUT QUESTION PAPER

This Question Paper is divided into three Sections – A, B and C. All Sections are compulsory. Attempt all Sections as per instructions.

- a) Section A question No. 1 to 10 are very short questions carrying 2 marks each.
- b) Section B question No. 11 to 25 are short questions carrying 3 marks each.
- c) Section C question No. 26 to 32 are long questions carrying 5 marks each.

- 5.** Student found in possession of Cellular Phone / Mobile Phone / Pager or any other Communication Device and/or any Book/Note whether using or not, will be liable to be debarred for taking examination(s) either permanently or for specified period or/and dealt with as per law or/and ordinance of the School/SERI according to the nature of offence, or/and he/she may be proceeded against and shall be liable for prosecution under the relevant provision of the Statutory Law.

TIME: 3 Hours.

TOTAL MARKS: 100

P.T.O.

SECTION A

Total number of questions: 10	Marks allocated to each question: 2	Total marks: 20
--------------------------------------	--	------------------------

$$px^2 - 2\sqrt{5} px + 15 = 0$$

Question 1. If the quadratic equation has two equal roots, then find the value of p.

Question 2. In Fig. 1, S and T are points on the sides PQ and PR, respectively of ΔPQR , such that $PT = 2$ cm, $TR = 4$ cm and ST is parallel to QR . Find the ratio of the areas of ΔPST and ΔPQR .

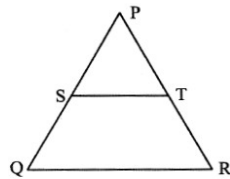


Fig. 1

$$\frac{3}{5}$$

Question 3. If $\cos A = \frac{3}{5}$, find the value of $16 \cot^2 A - 1$.

Question 4. Write the medium class of the following distribution:

Classes	Frequency
0 – 10	4
10 – 20	4
20 – 30	8
30 – 40	10
40 – 50	12
50 – 60	8
60 – 70	4

Question 5. Solve the following quadratic equation for x:

$$4x^2 + 4bx - (a^2 - b^2) = 0$$

Question 6. Find the relation between x and y if the points A(x, y), B(-5, 7) and C(-4, 5) are collinear.

Question 7. Two different dice are tossed together. Find the probability that the product of the two numbers on the top of the dice is 6.

$$\frac{\sin^3 \theta + \cos^3 \theta}{\sin \theta + \cos \theta} + \sin \theta \cos \theta$$

Question 8. Simplify:

Question 9. The internal and external diameters of a hollow hemispherical shell are 6 cm and 10 cm respectively. It is melted and recast into a solid cone of base diameter 14 cm. Find the height of the cone so formed.

Question 10. First two terms of an AP are -5 and -7. Find its 11th term.

SECTION B

Total number of questions: 15	Marks allocated to each question: 3	Total marks: 45
--------------------------------------	--	------------------------

$$\sqrt{3}x^2 - 2\sqrt{2}x - 2\sqrt{3} = 0$$

Question 11. Solve for x :

Question 12. If R(x, y) is a point on the line segment joining the points P(a, b) and Q(b, a), then prove that $x + y = a + b$.

P.T.O.

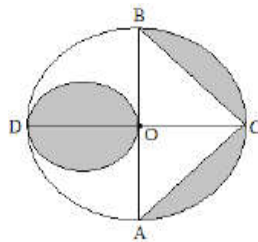
Question 13. Prove the following:

$$(\operatorname{cosec} A - \sin A)(\sec A - \cos A) = \frac{1}{\tan A + \cot A}$$

Question 14. Find the sum of all three digit numbers which are divisible by 7.

Question 15. An air-conditioner is available for Rs. 24,000 cash or for Rs. 8,000 as cash down payment followed by 6 monthly instalments of Rs. 2,800 each. Find the rate of interest charged under the instalment scheme.

Question 16. Find the area of a shaded region in the given figure where AB and CD are diameters of a circle with center O perpendicular to each other and OD is the diameter of the smaller circle such that OA = 7cm.



Question 17. Construct a triangle ABC with side $BC = 7\text{cm}$, $\angle B = 45^\circ$, $\angle C = 30^\circ$. Then construct a triangle whose sides are $\frac{4}{3}$ times the corresponding sides for triangle ABC.

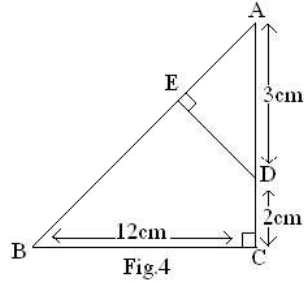
Question 18. Prove that the parallelogram circumscribing a circle is a rhombus.

Question 19. Solve for x:

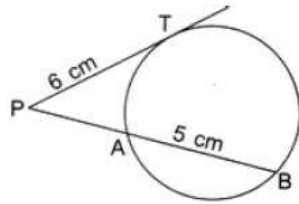
$$\frac{1}{p+q+x} = \frac{1}{p} + \frac{1}{q} + \frac{1}{x}$$

Question 20. Water in a canal 6m wide and 1.5m deep is flowing with a speed of 10km/hr. How much area will it irrigate in 30min, if 8cm of standing water is needed?

Question 21. In Figure $\triangle DABC$ is right angled at C and $DE \perp AB$. Prove that and hence find the length of AE and DE.



Question 22. In Figure 2, $PT = 6$ cm $AR = 5$ cm. Find the length of PA .



Question 23. A cubical block of side 10 cm is surmounted by a hemisphere. What is the largest diameter that the hemisphere can have? Find the cost of painting the total surface area of the solid so formed, at the rate of Rs. 5 per 100 sq. cm. [Use $\pi = 3.14$]

Question 24. The sum of two natural numbers is 8. Determine the numbers if the sum of their reciprocals is $8/15$.

Question 25. Find HCF and LCM of 336 and 54 by prime factorization and verify that $HCF \times LCM =$ product of the two numbers.

SECTION C

Total number of questions: 7	Marks allocated to each question: 5	Total marks: 35
-------------------------------------	--	------------------------

Question 26. A man standing on the deck of a ship, which is 10 m above the water level, observes the angle of elevation of the top of a hill as 60° and the angle of depression of the base of the hill as 30° . Calculate the distance of the hill from the ship and the height of the hill.

OR

The angle of elevation of the top of a hill at the foot of the tower is 60° and the angle of elevation of the top of the tower from the foot of the hill is 30° . If the tower is 50 m high, find the height of the hill.

Question 27. A card is drawn at random from a well-shuffled deck of playing cards. Find the probability that the card drawn is

- (a) a card of spade or an ace.
- (b) a black king.
- (c) neither a jack nor a king.
- (d) either a king or a queen.

OR

The angle of elevation of the top of tower at a distance of 120 m from a point A on the ground is 45° . if the angle of elevation of the top of a flagstaff fixed at the top of tower, at A is 60° , then find the height of the flagstaff.

Question 28. Find the mean, mode and median of the following frequency distribution:

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
-------	--------	---------	---------	---------	---------	---------	---------

P.T.O.

Frequency	4	4	7	10	12	8	5
-----------	---	---	---	----	----	---	---

OR

The following table shows the marks obtained by 100 students of class X in a school during a particular academic session. Find the mode of this distribution.

Marks	No. Of Students
Less than 10	7
Less than 20	21
Less than 30	34
Less than 40	46
Less than 50	66
Less than 60	77
Less than 70	92
Less than 80	100

Question 29. Find the values of k so that the area of the triangle with vertices $(1, -1)$, $(-4, 2k)$ and $(-k, -5)$ is 24 sq. units.

P.T.O.

OR

The difference of squares of two numbers is 88. If the larger number is 5 less than twice the smaller number, then find the two numbers.

Question 30. Solve for x : $(x-3)/(x-4) + (x-5)/(x-6) = 10/3$

OR

The sum of the squares of two consecutive odd numbers is 394. Find the numbers.

$$\frac{1}{\operatorname{cosec} \theta - \cot \theta} - \frac{1}{\sin \theta} = \frac{1}{\sin \theta} - \frac{1}{\operatorname{cosec} \theta + \cot \theta}$$

Question 31. Prove that

OR

Evaluate without using Trigonometric tables:

$$\frac{\cos 220^\circ + \cos^2 70^\circ}{\sec^2 50^\circ - \cot^2 40^\circ} + 2 \operatorname{cosec}^2 58^\circ - 2 \cot 58^\circ \tan 32^\circ - 4 \tan 13^\circ \tan 37^\circ \tan 45^\circ \tan 53^\circ \tan 77^\circ$$

Question 32. If the angle of elevation of a cloud from a point h meters above a lake is α and the angle of depression of its reflection in the lake is β , prove that the distance of the cloud from the point of observation is

$$\frac{2h \sec \alpha}{\tan \beta - \tan \alpha}$$

OR

D and E are points on the sides CA and CB respectively of $\triangle ABC$ right angled at C . prove that $AE^2 + BD^2 = AB^2 + DE^2$.

END OF THE QUESTION PAPER

Sample Paper