CHAPTER 05 PARALLEL AND INTERSECTING LINES

SUBJECT: MATHEMATICS **MAX. MARKS : 40**

CLASS : VII **DURATION : 1½ hrs**

General Instructions:

(i). **All** questions are compulsory.

(ii). This question paper contains 2**0** questions divided into five Sections A, B, C, D and E.

(iii). **Section A** comprises of **10 MCQs** of **1 mark** each. **Section B** comprises of 4 questions of **2 marks** each. **Section C** comprises of 3 questions of **3 marks** each. **Section D** comprises of 1 question of **5 marks** each and **Section E** comprises of 2 Case Study Based Questions of **4 marks** each.

(iv). There is no overall choice.

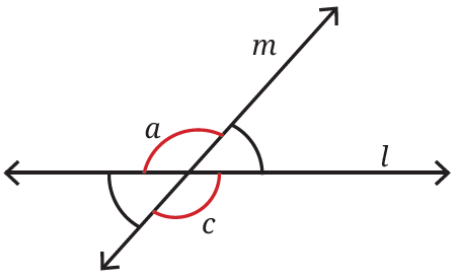
(v). **Use of Calculators is not permitted**

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. In the below figure, if ∠a = 70°, then ∠c = ?

(a) 70° (b) 110° (c) 180° (d) 90°



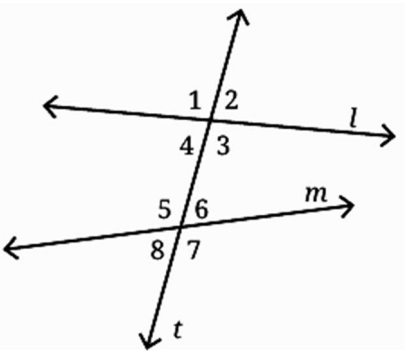
2. In the above figure, if ∠*a* = 90°, which term best describes lines *l* and *m*?

(a) Parallel (b) Intersecting

(c) Perpendicular (d) Skew

3. Two adjacent angles form a linear pair. If one angle is 45°, the other is –

(a) 135° (b) 145° (c) 90° (d) 180°



4. In the adjoining figure, line *t* intersects *l* and *m*. How many pairs of vertically opposite angles are formed?

(a) 2 (b) 3 (c) 4 (d) 8

5. If a transversal intersects two parallel lines, which of the following is always true?

(a) Corresponding angles unequal

(b) Alternate angles equal

(c) Interior angles on same side = 90°

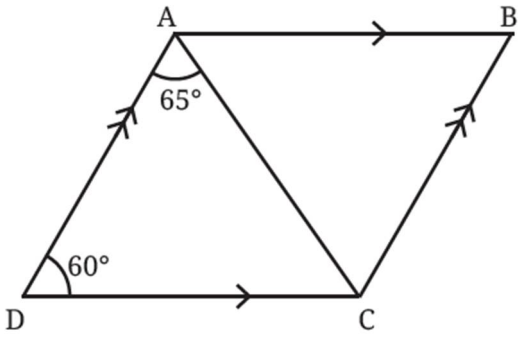
(d) Vertically opposite angles unequal

6. When a transversal intersects two parallel lines, what is the sum of all four interior angles?

(a) 360° (b) 180° (c) 720° (d) 540°

7. In the adjoining figure, ∠DAC = 65°, ∠ADC = 60°. Find ∠CAB.

(a) 50° (b) 55° (c) 60° (d) 65°

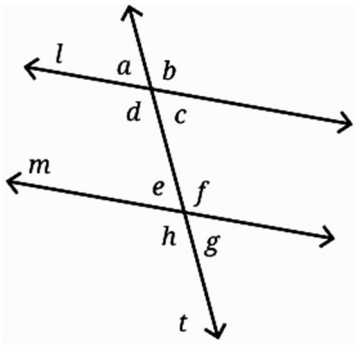


8. A railway bridge has vertical pillars and the ground. What kind of angle is formed between pillar and ground?

(a) Acute (b) Right (c) Obtuse (d) Reflex

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.



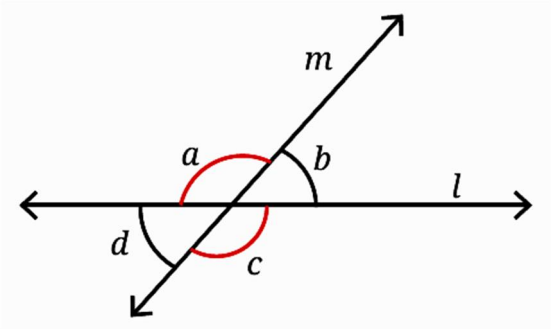
9. Assertion (A): In the adjoining figure, ∠f = ∠d.
Reason (R): Alternate interior angles formed by transversal on parallel lines are equal.

10. Assertion (A): Corresponding angles equal ⟹ lines are parallel.
Reason (R): Equality of corresponding angles is both necessary and sufficient condition for parallelism.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. In the adjoining figure, if ∠a = 115°, find ∠b, ∠c and ∠d.



12. A transversal intersects two lines such that corresponding angles are 78° each. Are the lines parallel? Why?

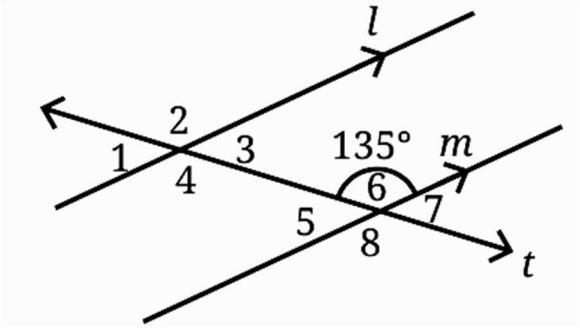
13. Two complementary angles are such that one angle is 30∘ less than twice the other. Find the measure of the larger angle.

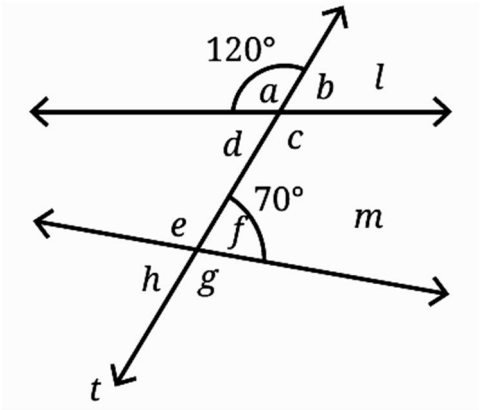
14. Draw two lines intersecting at a point such that one angle is 35°. Find the remaining three angles.

SECTION – C

Questions 15 to 17 carry 3 marks each.

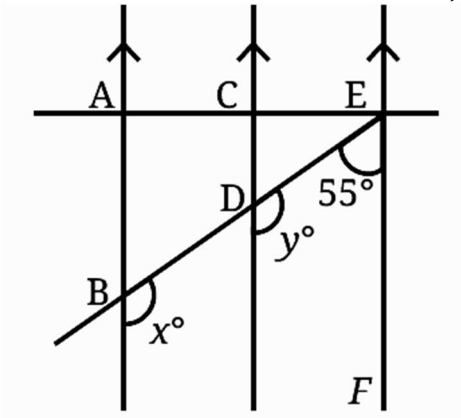
15. In the below left sided figure, ∠6 = 135°. Find measures of ∠1, ∠2, ∠3, ∠4, ∠5, ∠7, ∠8.





16. In the above right sided figure, ∠a = 120° and ∠f = 70°. Are *l* and *m* parallel? Give reason.

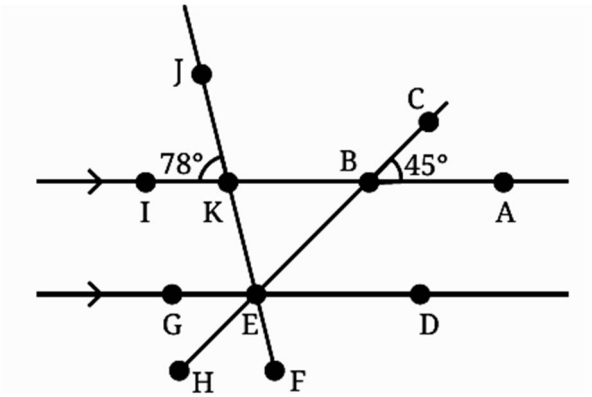
17. In the below figure, AB ∥ CD ∥ EF and EA ⊥ AB. If ∠BEF = 55°, find x and y.



SECTION – D

Questions 18 carry 5 marks each.

18. In the below figure, ∠ABC = 45° and ∠IKJ = 78°. Find angles ∠GEH, ∠HEF and ∠FED with reasoning.

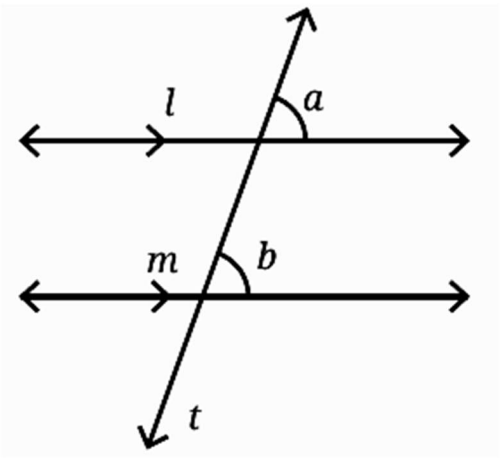


SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Case Study 1:

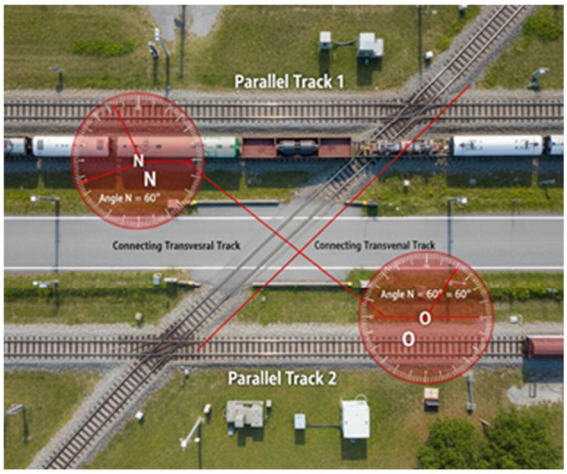
To alleviate rush hour congestion, **City Planners** are designing a new **flyover** over two major, parallel avenues, Elm Street and Oak Avenue. A crucial **connector road** is being added to link them, acting as a **transversal** line. For optimal traffic flow and **driver safety**, the engineers must rigorously measure the **corresponding angles** where the connector road meets the main avenues, ensuring they are **equal** to guarantee the smoothest possible transition between the parallel roads.

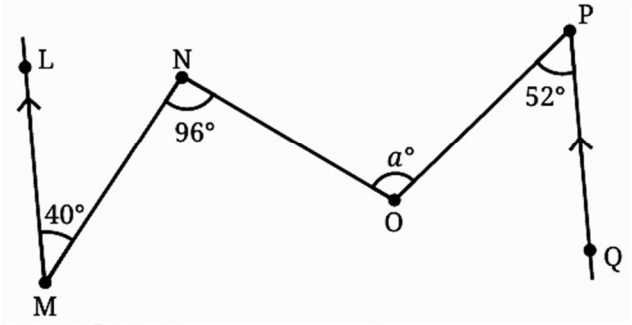


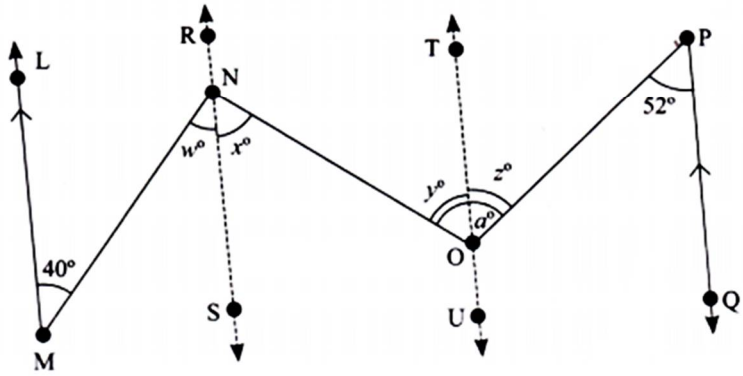
(i) Which angles are corresponding angles in the above figure?
(ii) If ∠a = 65°, what is ∠b?
(iii) Why must ∠a = ∠b for parallelism?
(iv) Write one real-life importance of parallel roads in city planning.

20. Case Study 2:

At the bustling **New Delhi Railway Junction**, two main tracks, **LM** and **PQ**, run perfectly parallel. A new high-speed **connecting track** cuts across both, creating crucial intersection points **N** and **O** where engineers must manage traffic flow. To test safety and signaling, the head engineer sketched two virtual **test lines**: line **RS** through point N, parallel to LM, and line **TU** through point O, parallel to PQ, creating a network of angles to analyze.







(i) If ∠NOP = a°, what type of angle relation must be checked to confirm parallelism of the tracks?
(ii) Find the angle x^0.
(iii) Find the angle z^0.
(iv) Find the angle a^0.