

2nd Year Paper 1
Part A
ANSWER THE FOLLOWING QUESTIONS (Paper-1)

1. Write a note on the following: (10 marks)

- (a) The concept of a group.
- (b) The concept of a subgroup.
- (c) The concept of a normal subgroup.
- (d) The concept of a quotient group.

2. Let G be a group and H a subgroup of G . Show that H is a normal subgroup of G if and only if $gH = Hg$ for all $g \in G$. (10 marks)

3. Let G be a group and H a subgroup of G . Show that H is a normal subgroup of G if and only if $gHg^{-1} = H$ for all $g \in G$. (10 marks)

4. Let G be a group and H a subgroup of G . Show that H is a normal subgroup of G if and only if $gHg^{-1} \subseteq H$ for all $g \in G$. (10 marks)

Part B

5. Let G be a group and H a subgroup of G . Show that H is a normal subgroup of G if and only if $gHg^{-1} = H$ for all $g \in G$. (10 marks)

6. Let G be a group and H a subgroup of G . Show that H is a normal subgroup of G if and only if $gHg^{-1} \subseteq H$ for all $g \in G$. (10 marks)

7. Let G be a group and H a subgroup of G . Show that H is a normal subgroup of G if and only if $gHg^{-1} = H$ for all $g \in G$. (10 marks)

8. Let G be a group and H a subgroup of G . Show that H is a normal subgroup of G if and only if $gHg^{-1} \subseteq H$ for all $g \in G$. (10 marks)

9. Let G be a group and H a subgroup of G . Show that H is a normal subgroup of G if and only if $gHg^{-1} = H$ for all $g \in G$. (10 marks)

Part C

10. Let G be a group and H a subgroup of G . Show that H is a normal subgroup of G if and only if $gHg^{-1} = H$ for all $g \in G$. (10 marks)

11. Let G be a group and H a subgroup of G . Show that H is a normal subgroup of G if and only if $gHg^{-1} \subseteq H$ for all $g \in G$. (10 marks)

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Part D

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Part E

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23. Let G be a group and H a subgroup of G . Show that H is a normal subgroup of G if and only if $gHg^{-1} \subseteq H$ for all $g \in G$. (10 marks)

Part F

24. Let G be a group and H a subgroup of G . Show that H is a normal subgroup of G if and only if $gHg^{-1} = H$ for all $g \in G$. (10 marks)

25. Let G be a group and H a subgroup of G . Show that H is a normal subgroup of G if and only if $gHg^{-1} \subseteq H$ for all $g \in G$. (10 marks)

26. Let G be a group and H a subgroup of G . Show that H is a normal subgroup of G if and only if $gHg^{-1} = H$ for all $g \in G$. (10 marks)

27. Let G be a group and H a subgroup of G . Show that H is a normal subgroup of G if and only if $gHg^{-1} \subseteq H$ for all $g \in G$. (10 marks)

28. Let G be a group and H a subgroup of G . Show that H is a normal subgroup of G if and only if $gHg^{-1} = H$ for all $g \in G$. (10 marks)