

WEEK 9 - INVERSIONS OF KINEMATIC CHAINS

MCQs WITH CORRECT ANSWERS

1. What is meant by inversion of a mechanism?

- A) Changing the shape of a link
- B) Fixing different links of a kinematic chain
- C) Removing a link from the chain
- D) Increasing the number of links

Answer: B

2. In inversion of a mechanism, the relative motion between links:

- A) Changes completely
- B) Becomes zero
- C) Remains unchanged
- D) Becomes irregular

Answer: C

3. The number of mechanisms obtained by inversion is generally equal to:

- A) Number of joints
- B) Number of links
- C) Number of pairs
- D) Number of frames

Answer: B

4. Which of the following is a type of kinematic chain?

- A) Four-bar chain
- B) Single slider-crank chain
- C) Double slider-crank chain
- D) All of the above

Answer: D

5. A single slider-crank chain contains:

- A) One sliding pair and three turning pairs
- B) Two sliding pairs and two turning pairs
- C) Four sliding pairs
- D) Four turning pairs

Answer: A

6. Which mechanism is an inversion of a single slider-crank chain?

- A) Beam engine
- B) Bull engine mechanism
- C) Elliptical trammel
- D) Coupling rod of locomotive

Answer: B

7. The bull engine mechanism is also known as:

- A) Pendulum pump
- B) Scotch yoke
- C) Elliptical trammel
- D) Pantograph

Answer: A

8. The crank and slotted lever quick return mechanism is commonly used in:

- A) Lathe machines
- B) Shaping machines
- C) Welding machines
- D) Drilling machines

Answer: B

9. The main purpose of a quick return mechanism is to:

- A) Increase cutting time
- B) Make return stroke faster than cutting stroke
- C) Stop the ram
- D) Increase machine weight

Answer: B

10. In a quick return mechanism, the tool performs the cutting operation during:

- A) Return stroke
- B) Forward stroke
- C) Both strokes
- D) Neither stroke

Answer: B

11. In the crank and slotted lever quick return mechanism, the crank rotates with:

- A) Variable angular speed
- B) Uniform angular speed
- C) Zero angular speed
- D) Oscillating speed

Answer: B

12. The ram in a quick return mechanism carries the:

- A) Crank
- B) Tool
- C) Flywheel
- D) Sliding block

Answer: B

13. A double slider-crank chain consists of:

- A) Four turning pairs
- B) Four sliding pairs
- C) Two sliding pairs and two turning pairs
- D) One sliding pair and three turning pairs

Answer: C

14. Which is an inversion of a double slider-crank chain?

- A) Beam engine
- B) Elliptical trammel
- C) Bull engine
- D) Watt's indicator

Answer: B

15. The three important inversions of a double slider-crank chain include:

- A) Beam engine, Watt's indicator, coupling rod
- B) Elliptical trammel, Scotch yoke, Oldham coupling
- C) Bull engine, beam engine, pantograph
- D) Quick return, beam engine, Watt's indicator

Answer: B

16. An elliptical trammel is an inversion of:

- A) Four-bar chain
- B) Single slider-crank chain
- C) Double slider-crank chain
- D) Five-bar chain

Answer: C

17. Scotch yoke mechanism converts:

- A) Rotary motion into reciprocating motion
- B) Reciprocating motion into rotary motion only
- C) Rotary motion into oscillating motion
- D) Oscillating motion into rotary motion

Answer: A

18. The main application of Scotch yoke mechanism is:

- A) Obtaining reciprocating motion
- B) Obtaining elliptical motion
- C) Measuring temperature
- D) Increasing belt speed

Answer: A

19. A pantograph is mainly used for:

- A) Welding
- B) Producing enlarged or reduced copies of figures
- C) Cutting threads
- D) Measuring temperature

Answer: B

20. A pantograph can be used to:

- A) Enlarge drawings
- B) Reduce drawings
- C) Reproduce drawings at different scales
- D) All of the above

Answer: D

21. A pantograph is commonly used for producing:

- A) Plane areas and figures
- B) Circular gears only
- C) Screw threads
- D) Cylindrical surfaces

Answer: A

22. In a pantograph, the reproduced figure can be:

- A) Only enlarged
- B) Only reduced
- C) Enlarged or reduced
- D) Neither enlarged nor reduced

Answer: C

23. The quick return mechanism is also associated with:

- A) Slotting machines
- B) Shaping machines
- C) Rotary internal combustion engines
- D) All of the above

Answer: D

24. In the quick return mechanism, the slotted bar:

- A) Rotates continuously
- B) Oscillates about a pivot
- C) Remains stationary
- D) Moves linearly only

Answer: B

25. The return stroke of a quick return mechanism is:

- A) Longer in time than cutting stroke
- B) Faster than cutting stroke
- C) Equal to cutting stroke
- D) Always stationary

Answer: B

26. Which mechanism is specifically used to reproduce the displacement of a reciprocating steam engine on a small scale?

- A) Scotch yoke
- B) Pantograph
- C) Bull engine
- D) Elliptical trammel

Answer: B

27. Inversion of a kinematic chain is obtained by:

- A) Changing the material of links
- B) Fixing different links successively
- C) Increasing the speed
- D) Removing joints

Answer: B

28. Which statement about inversion is correct?

- A) Relative motion changes
- B) Relative motion remains unchanged
- C) Number of links changes
- D) Number of joints becomes zero

Answer: B

29. The mechanism used to convert rotary motion into reciprocating motion in the beam engine is:

- A) Crank and lever mechanism
- B) Elliptical trammel
- C) Pantograph
- D) Scotch yoke

Answer: A

