

# 17409

**21415**

**3 Hours / 100 Marks**

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.  
(2) Answer each next main Question on a new page.  
(3) Illustrate your answers with neat sketches wherever necessary.  
(4) Figures to the right indicate full marks.  
(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

1. a) **Attempt any SIX of the following:** **12**
- (i) Define Camber.
  - (ii) Name the components of power steering system used in case of car. (any four)
  - (iii) State two advantages of air braking system.
  - (iv) State the function of suspension system. (any two)
  - (v) Mention the name of refrigerant used in car air conditioning. (any two)
  - (vi) State the function of the evaporator in car HVAC system.
  - (vii) Define tractive effort.
  - (viii) Define pitching.

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- b) **Attempt any TWO of the following:** **8**
- (i) Briefly explain procedure of painting of a new car.
  - (ii) Define the terms Rolling, Yawing.
  - (iii) What is the function of the compressor and expansion valve in car HVAC system?
- 2. Attempt any FOUR of the following:** **16**
- a) State the types of stub axle and draw any one type of stub axle arrangements.
  - b) What is the effect of king pin inclination on vehicle stability?
  - c) Draw a neat sketch of worm and roller type steering gear box.
  - d) State the function of brakes and classify the brakes on the basis of method of actuation.
  - e) Differentiate between telescopic shock absorber and gas filled shock absorber. (any four parameters)
  - f) Draw a neat labelled sketch of disc brake with fixed caliper.
- 3. Attempt any FOUR of the following:** **16**
- a) With the help of labelled sketch explain working of drum brake.
  - b) Draw the layout of HVAC used in cars and explain its operation.
  - c) Differentiate between independent suspension system and rigid axle suspension system.
  - d) Explain with neat sketch, 'Front wheel assembly'.
  - e) List any four types of vehicle bodies and write the material used for it.
  - f) Explain the working of central locking system. Also write one advantage and one disadvantage of it.

- 4. Attempt any TWO of the following:** **16**
- a) Explain Ackerman's principle of steering and linkage with sketch.
  - b) With a neat sketch explain the working of wheel cylinder.
  - c) Explain gas filled shock absorber with neat sketch.
- 5. Attempt any FOUR of the following:** **16**
- a) Draw a layout of Hydraulic power steering and state its advantages.
  - b) Explain inflation of air bag during collision. Name the gas used in air bags.
  - c) Draw the layout of air suspension system.
  - d) Write four properties of ideal refrigerant.
  - e) Explain semi-elliptic leaf spring with neat sketch.
  - f) Explain the effect of stream lining on vehicle performance.
- 6. Attempt any TWO of the following:** **16**
- a) Why tandem master cylinder is used? Explain the working of tandem cylinder with neat sketch.
  - b) Draw a layout of vapour compression cycle and explain its working.
  - c) With a neat sketch explain a collapsible steering.
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