

# 17620

16117

**3 Hours / 100 Marks**

Seat No.

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- Instructions* –
- (1) All Questions are *Compulsory*.
  - (2) Illustrate your answers with neat sketches wherever necessary.
  - (3) Figures to the right indicate full marks.
  - (4) Assume suitable data, if necessary.
  - (5) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.
  - (7) Use of Steam tables, logarithmic, Mollier's chart is permitted.

**Marks**

1. a) **Attempt any THREE of the following:** **12**
  - (i) Differentiate between controlled and uncontrolled ventilation. (four points)
  - (ii) Draw a neat labelled sketch of rotary vane compressor used in HVAC.
  - (iii) Explain the constructional features of 'Electromagnetic Clutch'?
  - (iv) What is 'climatic control'?
- b) **Attempt any ONE of the following:** **6**
  - (i) What is 'comfort zone'? Explain in brief with suitable example?
  - (ii) Explain with block diagram the working of 'Rear heating and cooling system' in automobile air-conditioning.

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- 2. Attempt any FOUR of the following:** **16**
- a) List four refrigerant with their color code.
  - b) What are the effect of humidity on human comfort.
  - c) Explain term 'Downstream and Upstream'.
  - d) State the functions of 'Drier'? Explain its construction with neat sketch.
  - e) State the working of 'orifice tube with neat sketch'.
  - f) Explain working principle of 'sun load sensor'? With neat sketch.
- 3. Attempt any FOUR of the following:** **16**
- a) What are the main requirement for designing HVAC system for heavy goods vehicle.
  - b) Describe construction and working of remote bulb.
  - c) What are the desirable properties of good refrigerant?
  - d) How 'Purity test' is carried out for refrigerant? State its necessity.
  - e) Enlist different types of vacuum devices used in HVAC controls?
- 4. a) Attempt any THREE of the following:** **12**
- (i) State the concept of 'Aspirator'.
  - (ii) What do you mean by 'outside temperature sensor'? State its location in automobile air conditioning.
  - (iii) State any two common faults and their remedies in 'compressor'.
  - (iv) What is the use of 'Gauge calibration recovery unit'?
- b) Attempt any ONE of the following:** **6**
- (i) Explain with neat sketch the 'Layout of Automobile air conditioning system'.
  - (ii) State the functions of 'Expansion Valve' i.e.
    - 1) Throttling action
    - 2) Modulating action
    - 3) Controlling action

- 5. Attempt any FOUR of the following:** **16**
- a) Explain working of 'Blower Clutch Control'?
  - b) State the procedure of leak testing with the help of 'Nitrogen Leak detector'.
  - c) How charging and discharging of refrigerant is carried out in automobile air conditioning.
  - d) What is 'Visual and Acoustic Check'? Explain with suitable example.
  - e) Distinguish between thermostatic expansion valve and fixed orifice tube. (four points)
  - f) Describe following heat transfer fundamentals
    - (i) convection
    - (ii) radiation
- 6. Attempt any FOUR of the following:** **16**
- a) Explain the construction of 'Ambient switch' with neat diagram.
  - b) Draw a neat labelled sketch of electronic climatic control system.
  - c) Describe construction and working of evaporator.
  - d) What is 'comfort heating system'?
  - e) Describe construction and working of fixed orifice tube.
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