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# National Testing Agency

<b>Question Paper Name :</b>	Thermodynamics and its Application 26th March 2021 Shift 1
<b>Subject Name :</b>	Thermodynamics and its Application
<b>Creation Date :</b>	2021-03-26 14:16:12
<b>Duration :</b>	180
<b>Number of Questions :</b>	100
<b>Total Marks :</b>	100
<b>Display Marks:</b>	Yes

## Thermodynamics and its Application

<b>Group Number :</b>	1
<b>Group Id :</b>	864351194
<b>Group Maximum Duration :</b>	0
<b>Group Minimum Duration :</b>	120
<b>Show Attended Group? :</b>	No
<b>Edit Attended Group? :</b>	No
<b>Break time :</b>	0
<b>Group Marks :</b>	100
<b>Is this Group for Examiner? :</b>	No

## Thermodynamics and its Application-1

<b>Section Id :</b>	864351650
<b>Section Number :</b>	1
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	100

**Number of Questions to be attempted :** 100  
**Section Marks :** 100  
**Mark As Answered Required? :** Yes  
**Sub-Section Number :** 1  
**Sub-Section Id :** 864351863  
**Question Shuffling Allowed :** Yes

**Question Number : 1 Question Id : 86435115748 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No  
Correct Marks : 1 Wrong Marks : 0**

Heat transferred to a closed stationary system at constant volume is equal to

1. Work transfer
2. Increase in internal energy
3. Increase in enthalpy
4. Increase in Gibbs function

**Options :**

86435153447. 1  
86435153448. 2  
86435153449. 3  
86435153450. 4

**Question Number : 2 Question Id : 86435115749 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No  
Correct Marks : 1 Wrong Marks : 0**

An open system is one in which

1. heat and work cross the boundary of the system, but the mass of the working substance does not
2. mass of working substance crosses the boundary of the system but the heat and work do not
3. both the heat and work as well as mass of the working substances cross the boundary of the system
4. neither the heat and work nor the mass of the working substances cross the boundary of the system

**Options :**

- 86435153451. 1
- 86435153452. 2
- 86435153453. 3
- 86435153454. 4

**Question Number : 3 Question Id : 86435115750 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

In the Polytropic process equation  $pv^n = \text{constant}$ , if  $n = 0$ , the process is termed as

1. constant volume
2. constant pressure
3. constant temperature
4. adiabatic

**Options :**

- 86435153455. 1
- 86435153456. 2
- 86435153457. 3
- 86435153458. 4

**Question Number : 4 Question Id : 86435115751 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 1 Wrong Marks : 0**

Which one of the following is NOT a point function?

1. Temperature
2. Pressure
3. Energy
4. Power

**Options :**

86435153459. 1  
86435153460. 2  
86435153461. 3  
86435153462. 4

**Question Number : 5 Question Id : 86435115752 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Choose which one of the following statements is correct?

1. Critical point involves equilibrium of solid and vapour phases
2. Critical point involves equilibrium of solid and liquid phases
3. Critical point involves equilibrium of solid, liquid and vapour phases
4. Triple point involves equilibrium of solid, liquid and vapours phases

**Options :**

86435153463. 1  
86435153464. 2  
86435153465. 3  
86435153466. 4

**Question Number : 6 Question Id : 86435115753 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A refrigerating machine working on reversed Carnot Cycle, takes out 2 kW of heat from the system while working between temperatures limits of 300 K and 200 K. The COP and Power consumed by the cycle will be respectively

1. 1 and 1 kW
2. 1 and 2 kW
3. 2 and 1 kW
4. 2 and 2 kW

**Options :**

86435153467. 1  
86435153468. 2  
86435153469. 3  
86435153470. 4

**Question Number : 7 Question Id : 86435115754 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Internal energy is defined by the

1. Zeroth Law of Thermodynamics
2. First Law of Thermodynamics
3. Second Law of Thermodynamics
4. Law of entropy

**Options :**

86435153471. 1  
86435153472. 2  
86435153473. 3  
86435153474. 4

**Question Number : 8 Question Id : 86435115755 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Two insulated tanks containing ideal gases at different pressures and temperature are connected to each other and gases are allowed to mix. The process that occur can be called

1. Free expansion
2. Constant enthalpy
3. Constant internal energy
4. Reversible adiabatic

**Options :**

- 86435153475. 1
- 86435153476. 2
- 86435153477. 3
- 86435153478. 4

**Question Number : 9 Question Id : 86435115756 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

The entropy of a system

1. can never decrease
2. can never increase
3. may increase or decrease
4. will always remain constant

**Options :**

- 86435153479. 1
- 86435153480. 2
- 86435153481. 3
- 86435153482. 4

**Question Number : 10 Question Id : 86435115757 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Match List 1 with List 2 and choose the correct answer from the code

List I	List II
(Equipment in a refrigeration system)	(Defines)
A. Compressor	I. Enthalpy remains constant
B. Evaporator	II. Enthalpy increases
C. Throttle valve	III. Enthalpy increases but pressure remains constant
D. Condenser	IV. Enthalpy decreases but pressure remains constant

Choose the **correct** answer from the options given below:

1. A - III , B - II , C - I , D - IV
2. A - II , B - III , C - IV , D - I
3. A - II , B - III , C - I , D - IV
4. A - IV , B - II , C - I , D - III

**Options :**

- 86435153483. 1
- 86435153484. 2
- 86435153485. 3
- 86435153486. 4

**Question Number : 11 Question Id : 86435115758 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Kelvin-Planck's statement deals with

1. Conservation of energy
2. Conservation of heat
3. Conservation of mass
4. Conversion of heat into work

**Options :**

- 86435153487. 1
- 86435153488. 2
- 86435153489. 3
- 86435153490. 4

**Question Number : 12 Question Id : 86435115759 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Dryness fraction of wet steam is given by

1. ratio of mass of dry steam to the mass of suspended liquid water
2. ratio of mass of suspended liquid water to mass of dry steam
3. ratio of mass of dry steam to the sum of mass of suspended liquid water and dry steam
4. ratio of sum of mass of suspended liquid water and dry steam to the mass of dry steam

**Options :**

- 86435153491. 1
- 86435153492. 2
- 86435153493. 3
- 86435153494. 4

**Question Number : 13 Question Id : 86435115760 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**



Cooling tower in steam power station is a device for

1. condensing the steam into water
2. cooling the exhaust gases coming out of the boiler
3. reducing the temperature of superheated steam
4. reducing the temperature of cooling water used in condenser

**Options :**

- 86435153495. 1
- 86435153496. 2
- 86435153497. 3
- 86435153498. 4

**Question Number : 14 Question Id : 86435115761 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 1 Wrong Marks : 0**

A process that occurs in an closed system is

1. closed flow process
2. non-flow process
3. open flow process
4. none of these

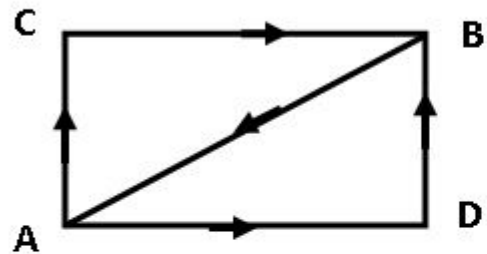
**Options :**

- 86435153499. 1
- 86435153500. 2
- 86435153501. 3
- 86435153502. 4

**Question Number : 15 Question Id : 86435115762 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 1 Wrong Marks : 0**

When a system is taken from state A to state B along the path A-C-B, 200 kJ of heat flows into the system and it does 150 kJ of work as shown in the figure.



How much heat will flow into the system along the path A-D-B, if the work done by it along the path is 60 kJ?

- 1. 90 kJ
- 2. 110 kJ
- 3. 120 kJ
- 4. 130 kJ

**Options :**

- 86435153503. 1
- 86435153504. 2
- 86435153505. 3
- 86435153506. 4

**Question Number : 16 Question Id : 86435115763 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

If the relative change in the density of a fluid in a process is negligible then it is called

1. Compressible flow
2. Incompressible flow
3. Steady flow
4. Unsteady flow

**Options :**

- 86435153507. 1
- 86435153508. 2
- 86435153509. 3
- 86435153510. 4

**Question Number : 17 Question Id : 86435115764 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

The maximum temperature from the combustor is limited because

1. It is difficult to burn the fuel
2. The air-fuel ratio is too lean
3. Combustion chamber walls cannot sustain high temperature
4. Turbine blades cannot accept very high temperatures

**Options :**

- 86435153511. 1
- 86435153512. 2
- 86435153513. 3
- 86435153514. 4

**Question Number : 18 Question Id : 86435115765 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

With the increase in pressure

1. The boiling point of water decreases and enthalpy of evaporation increases
2. The boiling point of water increases and enthalpy of evaporation decreases
3. Both the boiling point of water and the enthalpy of evaporation decreases
4. Both the boiling point of water and the enthalpy of evaporation increases

**Options :**

86435153515. 1

86435153516. 2

86435153517. 3

86435153518. 4

**Question Number : 19 Question Id : 86435115766 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

An ideal cycle with reheat, intercooling and heat exchange will increase

1. Efficiency
2. Work output
3. Both efficiency and work output
4. None of these

**Options :**

86435153519. 1

86435153520. 2

86435153521. 3

86435153522. 4

**Question Number : 20 Question Id : 86435115767 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

The overall efficiency of thermal power plant is equal to

1. Rankine cycle efficiency
2. Carnot cycle efficiency
3. Regenerative cycle efficiency
4. Boiler efficiency X Turbine efficiency X Generator efficiency

**Options :**

86435153523. 1  
86435153524. 2  
86435153525. 3  
86435153526. 4

**Question Number : 21 Question Id : 86435115768 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Isentropic efficiency of a compressor is defined as the ratio of

1.  $\frac{\text{Isentropic Work Input}}{\text{Stoichiometric work Input}}$
2.  $\frac{\text{Isentropic Work Input}}{\text{Actual Work Input}}$
3.  $\frac{\text{Actual Work Input}}{\text{Isentropic Work Input}}$
4.  $\frac{\text{Stoichiometric Work Input}}{\text{Isentropic Work Input}}$

**Options :**

86435153527. 1  
86435153528. 2  
86435153529. 3  
86435153530. 4

**Question Number : 22 Question Id : 86435115769 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Work input to the air compressor with 'n' as index of compression

1. Increases with increase in value of n
2. Decreases with increase in value of n
3. Remain same whatever the value of n
4. First increases and then decrease with increase of value of n

**Options :**

- 86435153531. 1
- 86435153532. 2
- 86435153533. 3
- 86435153534. 4

**Question Number : 23 Question Id : 86435115770 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

To increase in clearance volume, the ideal work of compressing 1 kg of air

1. Increases
2. Decreases
3. Remains same
4. First increases and then deceases

**Options :**

- 86435153535. 1
- 86435153536. 2
- 86435153537. 3
- 86435153538. 4

**Question Number : 24 Question Id : 86435115771 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

The following is the correct order of energy conversation in thermal power plants

1. Chemical energy – Mechanical energy – Electrical energy
2. Mechanical energy – Chemical energy – Electrical energy
3. Wind energy – Mechanical energy – Electrical energy
4. Heat energy – Electrical energy – Mechanical energy

**Options :**

- 86435153539. 1
- 86435153540. 2
- 86435153541. 3
- 86435153542. 4

**Question Number : 25 Question Id : 86435115772 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

The amount of energy used per day in a lighting system is calculated in:

1. luminaries per day
2. Watts per day
3. kWh (kilowatt- hours)
4. lumens per hour

**Options :**

- 86435153543. 1
- 86435153544. 2
- 86435153545. 3
- 86435153546. 4

**Question Number : 26 Question Id : 86435115773 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

In a refrigerator plant, if the condenser temperature increases, the power input to the compressor will

1. Decrease
2. Increase
3. Remain the same
4. Be unpredictable

**Options :**

- 86435153547. 1
- 86435153548. 2
- 86435153549. 3
- 86435153550. 4

**Question Number : 27 Question Id : 86435115774 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

In an ideal refrigeration (reversed Carnot) cycle, the condenser and evaporator temperature are 27°C and -13°C respectively. The COP of this cycle would be

1. 6.5
2. 7.5
3. 10.5
4. 15.0

**Options :**

- 86435153551. 1
- 86435153552. 2
- 86435153553. 3
- 86435153554. 4

**Question Number : 28 Question Id : 86435115775 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**



Which of the following statements are correct?

- A. Compressor seal failure.
- B. Freezing at the expansion valve
- C. Restriction to refrigerant flow
- D. Corrosion of steel parts

Choose the correct answer from the options given below

- 1. A, B, C and D
- 2. A and B only
- 3. B, C and D only
- 4. A, C and D only

**Options :**

- 86435153555. 1
- 86435153556. 2
- 86435153557. 3
- 86435153558. 4

**Question Number : 29 Question Id : 86435115776 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A humidification process means

- 1. decrease in relative humidity
- 2. an increase in specific humidity
- 3. a decrease in temperature
- 4. an increase in temperature

**Options :**

- 86435153559. 1

86435153560. 2  
86435153561. 3  
86435153562. 4

**Question Number : 30 Question Id : 86435115777 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

In a cooling tower, "**approach**" is the temperature difference between the

1. Hot inlet water and cold outlet water
2. Hot inlet water and WBT
3. Cold outlet water and WBT
4. DBT and WBT

**Options :**

86435153563. 1  
86435153564. 2  
86435153565. 3  
86435153566. 4

**Question Number : 31 Question Id : 86435115778 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

The air with enthalpy of 100 kJ/kg is compressed by an air compressor to a pressure and temperature at which its enthalpy becomes 200 kJ/kg. The loss of heat is 40 kJ/kg from the compressor as the air passes through it. Neglecting kinetic and potential energies, the power required for an air mass flow of 0.5 kg/s is

1. 30 kW
2. 50 kW
3. 70 kW
4. 90 kW

**Options :**

86435153567. 1

86435153568. 2

86435153569. 3

86435153570. 4

**Question Number : 32 Question Id : 86435115779 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Which of the following statements are correct?

A real gas obeys perfect gas law at very

A. high temperatures

B. high pressures

C. low pressures

Choose the correct answer from the options given below

1. A alone

2. A and C alone

3. B alone

4. C alone

**Options :**

86435153571. 1

86435153572. 2

86435153573. 3

86435153574. 4

**Question Number : 33 Question Id : 86435115780 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Consider the following thermodynamic relations:

A.  $T ds = du + p dv$

B.  $T ds = du - p dv$

C.  $T ds = dh + p dv$

D.  $T ds = dh - p dv$

Which of these thermodynamics relations are correct?

1. A and C only

2. A and D only

3. B and C only

4. B and D only

**Options :**

86435153575. 1

86435153576. 2

86435153577. 3

86435153578. 4

**Question Number : 34 Question Id : 86435115781 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Match items in List I (process) with those in List II (Characteristics) and select the correct answer using codes given below the lists:

List I	List II
A. Throttling Process	I. No work done
B. Isentropic Process	II. No Change in entropy
C. Free expansion	III. Constant internal energy
D. Isothermal process	IV. Constant enthalpy

Choose the **correct** answer from the options given below:

1. A - IV , B - II, C - I, D - III
2. A - I, B - II, C - IV, D - III
3. A - IV, B - III, C - I, D - II
4. A - I, B - III, C - IV, D - II

**Options :**

- 86435153579. 1
- 86435153580. 2
- 86435153581. 3
- 86435153582. 4

**Question Number : 35 Question Id : 86435115782 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A reversible heat engine receives 6 kJ of heat from thermal reservoir at temperature 800 K, and 8 kJ of heat from another thermal reservoir at temperature 600 K. If it rejects heat to a third thermal reservoir at temperature 100 K, then the thermal efficiency of the engine is approximately equal to:

1. 65%
2. 75%
3. 80%
4. 85%

**Options :**

86435153583. 1  
86435153584. 2  
86435153585. 3  
86435153586. 4

**Question Number : 36 Question Id : 86435115783 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Identify the process for which the two integrals  $\int p \, dv$  and  $-\int v \, dp$ , evaluated between any two given states give the same value

1. Isenthalpic
2. Isothermal
3. Isentropic
4. Polytropic

**Options :**

86435153587. 1  
86435153588. 2  
86435153589. 3  
86435153590. 4

**Question Number : 37 Question Id : 86435115784 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 1 Wrong Marks : 0**

Saturated liquid at a high pressure  $p_1$  having enthalpy of saturated liquid 1000 kJ/kg is throttled to a lower pressure  $p_2$ . At pressure  $p_2$ , enthalpy of saturated liquid and that of the saturated vapour are 800 kJ/kg and 2800 kJ/kg respectively. The dryness fraction of vapour after throttling process is

1. 0.1
2. 0.5
3. 18/28
4. 0.8

**Options :**

86435153591. 1  
86435153592. 2  
86435153593. 3  
86435153594. 4

**Question Number : 38 Question Id : 86435115785 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

In a steady-flow adiabatic turbine, the changes in the internal energy, enthalpy, kinetic energy and potential energy of the working fluid, from inlet to exit, are - 100 kJ/kg, -140 kJ/kg, -10 kJ/kg and 0 kJ/kg respectively. Which one of the following gives the amount of work developed by the turbine?

1. 100 kJ/kg
2. 110 kJ/kg
3. 140 kJ/kg
4. 150 kJ/kg

**Options :**

86435153595. 1

86435153596. 2

86435153597. 3

86435153598. 4

**Question Number : 39 Question Id : 86435115786 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

In aircrafts, air refrigeration cycle is used because of

1. Low unit weight per tonne of refrigeration
2. High heat transfer rate
3. Lower temperature at high altitudes
4. Higher co-efficient of performance

**Options :**

86435153599. 1

86435153600. 2

86435153601. 3

86435153602. 4

**Question Number : 40 Question Id : 86435115787 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**



Which of the following are intensive properties?

- A. Kinetic Energy
- B. Specific Enthalpy
- C. Pressure
- D. Entropy

Select the correct answer using the code given below:

- 1. A and C
- 2. B and C
- 3. A, C and D
- 4. B and D

**Options :**

- 86435153603. 1
- 86435153604. 2
- 86435153605. 3
- 86435153606. 4

**Question Number : 41 Question Id : 86435115788 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A closed system undergoes a process 1-2 for which the values of  $Q_{1-2}$  and  $W_{1-2}$  are +20kJ and +50 kJ respectively. If the system is returned to state 1, and  $Q_{2-1}$  is -10 kJ, what is the value of the work  $W_{2-1}$ ?

1. +20 kJ
2. -40 kJ
3. -80 kJ
4. +40 kJ

**Options :**

86435153607. 1  
86435153608. 2  
86435153609. 3  
86435153610. 4

**Question Number : 42 Question Id : 86435115789 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A reversible engine operate between temperatures 900 K and  $T_2$  ( $T_2 < 900$  K), and another reversible engine between  $T_2$  and 400 K ( $T_2 > 400$  K) in series. What is the value of  $T_2$  if work outputs of both the engines are equal?

1. 600 K
2. 625 K
3. 650 K
4. 675 K

**Options :**

86435153611. 1  
86435153612. 2  
86435153613. 3  
86435153614. 4

**Question Number : 43 Question Id : 86435115790 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A gas is compressed in a cylinder by a movable piston to a volume one-half of its original volume. During the process, 300 kJ heat left the gas and the internal energy remained same. What is the work done on the gas?

1. 100 kNm
2. 150 kNm
3. 200 kNm
4. 300 kNm

**Options :**

- 86435153615. 1
- 86435153616. 2
- 86435153617. 3
- 86435153618. 4

**Question Number : 44 Question Id : 86435115791 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Which one of the following is the fluid whose properties in all its three phases are made use of in thermodynamics?

1. Ammonia
2. Freon 12
3. Helium
4. Water

**Options :**

- 86435153619. 1
- 86435153620. 2
- 86435153621. 3
- 86435153622. 4

**Question Number : 45 Question Id : 86435115792 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Which one of the following thermodynamic processes approximates the steaming of food in a pressure cooker?

1. Isenthalpic
2. Isobaric
3. Isochoric
4. Isothermal

**Options :**

- 86435153623. 1
- 86435153624. 2
- 86435153625. 3
- 86435153626. 4

**Question Number : 46 Question Id : 86435115793 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Match List I (Type of Thermometer) with List II (Thermometric property) and select the correct answer using the code below the lists:

List I	List II
A. Mercury-in-glass	I. Pressure
B. Thermocouple	II. Electrical resistance
C. Thermistor	III. Volume
D. Constant volume gas	IV. Induced electric Voltage

Choose the **correct** answer from the options given below:

1. A - I, B - IV, C - II, D - III
2. A - III, B - II, C - IV, D - I
3. A - I, B - II, C - IV, D - III
4. A - III, B - IV, C - II, D - I

**Options :**

86435153627. 1  
86435153628. 2  
86435153629. 3  
86435153630. 4

**Question Number : 47 Question Id : 86435115794 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A balloon which is initially collapsed and flat is slowly filled with a gas at 100 kPa so as to form it into a sphere of 1 m radius. What is the work done by the gas in the balloon during the filling process?

1. 428.9 kJ
2. 418.9 kJ
3. 420.9 kJ
4. 416.9 kJ

**Options :**

- 86435153631. 1
- 86435153632. 2
- 86435153633. 3
- 86435153634. 4

**Question Number : 48 Question Id : 86435115795 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A 4 kW, 20 litre water heater is switched on for 10 minutes. The heat capacity  $C_p$  for water is 4 kJ/kg K. Assuming all the electrical energy has gone into heating the water, what is the increase of the water temperature?

1. 15°C
2. 20°C
3. 26°C
4. 30°C

**Options :**

- 86435153635. 1
- 86435153636. 2
- 86435153637. 3
- 86435153638. 4

**Question Number : 49 Question Id : 86435115796 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

In which one of the following processes, in a closed system the thermal energy transferred to a gas is completely converted to internal energy resulting in an increase in gas temperature?

1. Isochoric process
2. Adiabatic process
3. Isothermal process
4. Free expansion

**Options :**

- 86435153639. 1
- 86435153640. 2
- 86435153641. 3
- 86435153642. 4

**Question Number : 50 Question Id : 86435115797 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Which one of the following is correct? The specific volume of water when heated from 0°C

1. First increases and then decreases
2. First decreases and then increases
3. Increases steadily
4. Decreases steadily

**Options :**

- 86435153643. 1
- 86435153644. 2
- 86435153645. 3
- 86435153646. 4

**Question Number : 51 Question Id : 86435115798 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 1 Wrong Marks : 0**

Ice kept in a well insulated thermo flask is an example of which system?

1. Closed system
2. Isolated system
3. Open system
4. Non-flow adiabatic system

**Options :**

86435153647. 1  
86435153648. 2  
86435153649. 3  
86435153650. 4

**Question Number : 52 Question Id : 86435115799 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 1 Wrong Marks : 0**

In a reversible isothermal expansion process, the fluid expands from 10 bar and 2 m<sup>3</sup> to 2 bar 10 m<sup>3</sup>, during the process the heat supplied is 100 kW. What is the work done during the process?

1. 33.3 kW
2. 100 kW
3. 80 kW
4. 20 kW

**Options :**

86435153651. 1  
86435153652. 2  
86435153653. 3  
86435153654. 4

**Question Number : 53 Question Id : 86435115800 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 1 Wrong Marks : 0**



85 kJ of heat is supplied to a closed system at constant volume. During the next process, the system rejects 90 kJ of heat at constant pressure while 20 kJ of work is done on it. The system is brought to the original state by an adiabatic process. The initial internal energy is 100 kJ. Then what is the quantity of work transfer during the process?

1. 30 kJ
2. 25 kJ
3. 20 kJ
4. 15 kJ

**Options :**

- 86435153655. 1
- 86435153656. 2
- 86435153657. 3
- 86435153658. 4

**Question Number : 54 Question Id : 86435115801 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Three engines A, B and C operating on Carnot cycle use working substances as Argon, Oxygen and Air respectively. Which engine will have higher efficiency?

1. Engine A
2. Engine B
3. Engine C
4. All engines have same efficiency

**Options :**

- 86435153659. 1
- 86435153660. 2
- 86435153661. 3
- 86435153662. 4

**Question Number : 55 Question Id : 86435115802 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 1 Wrong Marks : 0**

An engine working on Carnot cycle rejects 40% of absorbed heat from the source, while the sink temperature is maintained at 27°C, then what is the source temperature?

1. 750 °C
2. 477°C
3. 203°C
4. 67.5°C

**Options :**

86435153663. 1  
86435153664. 2  
86435153665. 3  
86435153666. 4

**Question Number : 56 Question Id : 86435115803 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 1 Wrong Marks : 0**

A heat engine is supplied with 250 kJ/s of heat at a constant fixed temperature of 227 °C, the heat is rejected at 27 °C, the cycle is reversible, then what amount of heat is rejected?

1. 250 kJ/s
2. 280 kJ/s
3. 180 kJ/s
4. 150 kJ/s

**Options :**

86435153667. 1  
86435153668. 2  
86435153669. 3  
86435153670. 4

**Question Number : 57 Question Id : 86435115804 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 1 Wrong Marks : 0**

Consider the following properties:

- A. Temperature
- B. Viscosity
- C. Specific entropy
- D. Thermal conductivity

Which of the above properties of a system is/are intensive?

- 1. A only
- 2. B and C only
- 3. B, C and D only
- 4. A, B, C and D

**Options :**

- 86435153671. 1
- 86435153672. 2
- 86435153673. 3
- 86435153674. 4

**Question Number : 58 Question Id : 86435115805 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A reversible heat engine rejects 50 percent of the heat supplied during a cycle of operation. If this engine is reversed and operates as a heat pump, then what is its coefficient of performance?

1. 1.0
2. 1.5
3. 2.0
4. 2.5

**Options :**

- 86435153675. 1
- 86435153676. 2
- 86435153677. 3
- 86435153678. 4

**Question Number : 59 Question Id : 86435115806 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Efficiency of a Carnot engine is 75%. If the direction is reversed, COP of the Carnot refrigerator is

1. 1.33
2. 0.75
3. 0.33
4. 1.75

**Options :**

- 86435153679. 1
- 86435153680. 2
- 86435153681. 3
- 86435153682. 4

**Question Number : 60 Question Id : 86435115807 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Consider the following:

(A) Temperature

(B) Viscosity

(C) Internal energy

(D) Entropy

Which of these are extensive properties?

1. A,B,C and D
2. B and D only
3. B and C only
4. C and D only

**Options :**

86435153683. 1

86435153684. 2

86435153685. 3

86435153686. 4

**Question Number : 61 Question Id : 86435115808 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Fire tube boilers are those in which

1. flue gases pass through tubes and water around it
2. water passes through the tubes and flue gases around it
3. fever circulation takes place
4. tubes are laid vertically

**Options :**

86435153687. 1

86435153688. 2

86435153689. 3

86435153690. 4

**Question Number : 62 Question Id : 86435115809 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A closed system received 60 kJ heat but its internal energy decrease by 30 kJ. Then the work done by the system is

1. 90 kJ
2. 30 kJ
3. -30 kJ
4. -90 kJ

**Options :**

86435153691. 1

86435153692. 2

86435153693. 3

86435153694. 4

**Question Number : 63 Question Id : 86435115810 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

In the absorption refrigeration cycle, the compressor of the vapour compression refrigeration cycle is replaced by

1. Liquid pump
2. Generator
3. Absorber and generator
4. Absorber, liquid pump and generator

**Options :**

86435153695. 1

86435153696. 2

86435153697. 3

86435153698. 4

**Question Number : 64 Question Id : 86435115811 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

The enthalpies at the beginning of compression, at the end of compression and at the end of condensation are respectively 185 kJ/kg, 210 kJ/kg and 85 kJ/kg. The COP of the vapour compression refrigeration system is

1. 0.25

2. 5.4

3. 4

4. 1.35

**Options :**

86435153699. 1

86435153700. 2

86435153701. 3

86435153702. 4

**Question Number : 65 Question Id : 86435115812 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A solar-absorption refrigeration system has generator temperature of  $87^{\circ}\text{C}$ , evaporator temperature of  $-3^{\circ}\text{C}$ , condenser and absorber temperatures of  $27^{\circ}\text{C}$  each, then its maximum possible COP is

1. 10.0
2. 9.0
3. 1.80
4. 1.50

**Options :**

- 86435153703. 1
- 86435153704. 2
- 86435153705. 3
- 86435153706. 4

**Question Number : 66 Question Id : 86435115813 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A one ton capacity water cooler cools water steadily from  $35^{\circ}\text{C}$  to  $20^{\circ}\text{C}$ . The specific heat of water is  $4.18 \text{ kJ}/(\text{kg K})$ . The water flow rate will be, nearly,

1. 13.33 litre/hr
2. 33.3 litre/hr
3. 200 litre/hr
4. 250 litre/hr

**Options :**

- 86435153707. 1
- 86435153708. 2
- 86435153709. 3
- 86435153710. 4

**Question Number : 67 Question Id : 86435115814 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**



**Correct Marks : 1 Wrong Marks : 0**

In a cyclic heat engine operating between a source temperature of  $600^{\circ}\text{C}$  and a sink temperature of  $20^{\circ}\text{C}$ , the least rate of heat rejection per kW net output of the engine is

1. 0.466 kW
2. 0.505 kW
3. 0.588 kW
4. 0.650 kW

**Options :**

- 86435153711. 1
- 86435153712. 2
- 86435153713. 3
- 86435153714. 4

**Question Number : 68 Question Id : 86435115815 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 1 Wrong Marks : 0**

A Carnot refrigerator requires 1.5 kW/ton of refrigeration to maintain a region at a temperature of  $-30^{\circ}\text{C}$ . The C.O.P. of the Carnot refrigerator is

1. 1.42
2. 2.33
3. 2.87
4. 3.26

**Options :**

- 86435153715. 1
- 86435153716. 2
- 86435153717. 3
- 86435153718. 4

**Question Number : 69 Question Id : 86435115816 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Theoretical maximum C.O.P. of a Vapour Absorption Refrigeration System (where,  $T_G$  = generator temp,  $T_E$  = evaporator temp,  $T_O$  = environmental temp) is

1.  $\frac{T_E}{T_G} \left( \frac{T_G - T_O}{T_O - T_E} \right)$
2.  $\frac{T_E}{T_G} \left( \frac{T_O - T_E}{T_G - T_O} \right)$
3.  $\frac{T_G}{T_E} \left( \frac{T_G - T_O}{T_O - T_E} \right)$
4.  $\frac{T_G}{T_E} \left( \frac{T_O - T_E}{T_G - T_O} \right)$

**Options :**

- 86435153719. 1
- 86435153720. 2
- 86435153721. 3
- 86435153722. 4

**Question Number : 70 Question Id : 86435115817 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A heat engine with 30% efficiency drives a refrigerator of C.O.P. 5.0. What would be the net heat input per second to the engine for each MW of heat removed in the refrigerator?

1. 66.67 kJ
2. 600 kJ
3. 666.67 kJ
4. 6600 kJ

**Options :**

- 86435153723. 1
- 86435153724. 2
- 86435153725. 3
- 86435153726. 4

**Question Number : 71 Question Id : 86435115818 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Which one of the following statements is correct?

In a domestic refrigerator periodic defrosting is required because frosting

- 1. causes corrosion of materials
- 2. reduces heat extraction
- 3. overcools food stuff
- 4. partially blocks refrigerant flow

**Options :**

- 86435153727. 1
- 86435153728. 2
- 86435153729. 3
- 86435153730. 4

**Question Number : 72 Question Id : 86435115819 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A refrigerator based on reversed Carnot cycle works in between two such temperatures that the ratio between the low and high temperature is 0.8. If a heat pump is operated between same temperature ranges, then what would be its COP?

1. 2
2. 3
3. 4
4. 5

**Options :**

- 86435153731. 1
- 86435153732. 2
- 86435153733. 3
- 86435153734. 4

**Question Number : 73 Question Id : 86435115820 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A refrigeration plant uses a condenser with heat rejection ratio of 1.2. If the capacity of the plant is 210 kJ/min, then what is the value of the COP of the refrigeration plant?

1. 3
2. 5
3. 7
4. 9

**Options :**

- 86435153735. 1
- 86435153736. 2
- 86435153737. 3
- 86435153738. 4

**Question Number : 74 Question Id : 86435115821 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 1 Wrong Marks : 0**

Which one of the following statements is correct?

The optimum effective temperature for human comfort is

1. Higher in winter than that in summer
2. Lower in winter than that in summer
3. Same in winter and summer
4. Not dependent on season.

**Options :**

- 86435153739. 1
- 86435153740. 2
- 86435153741. 3
- 86435153742. 4

**Question Number : 75 Question Id : 86435115822 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A heat pump is used to heat a house in the winter and then reversed to cool the house in the summer. The inside temperature of the house is to be maintained at 20°C. The heat transfer through the house wall is 7.9 MJ/s and the outside temperature in winter is 5°C. What is the minimum power (Approximate required to drive the heat pump)?

1. 40.5 kW
2. 405 kW
3. 42.5 kW
4. 425 kW

**Options :**

- 86435153743. 1
- 86435153744. 2
- 86435153745. 3
- 86435153746. 4

**Question Number : 76 Question Id : 86435115823 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Which one of the following is correct?

During sensible cooling of moist air, its relative humidity

1. increases
2. does not change
3. decreases
4. affects specific humidity

**Options :**

86435153747. 1

86435153748. 2

86435153749. 3

86435153750. 4

**Question Number : 77 Question Id : 86435115824 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

In vapour absorption refrigeration system heating in generator is done at  $177^{\circ}\text{C}$ , refrigeration in evaporator at  $-3^{\circ}\text{C}$  and cooling in condenser at  $27^{\circ}\text{C}$ . Then what will be the maximum COP of the system?

1. 1.5
2. 2.0
3. 3.0
4. 4.0

**Options :**

86435153751. 1

86435153752. 2

86435153753. 3

86435153754. 4

**Question Number : 78 Question Id : 86435115825 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

An ideal refrigerator is operating between a condenser temperature of  $37^{\circ}\text{C}$  and an evaporator temperature of  $-3^{\circ}\text{C}$ . If the machine is functioning as a heat pump, its coefficient of performance will be

1. 6.00
2. 6.75
3. 7.00
4. 7.75

**Options :**

- 86435153755. 1
- 86435153756. 2
- 86435153757. 3
- 86435153758. 4

**Question Number : 79 Question Id : 86435115826 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

In the bottoming cycle of cogeneration, low grade waste heat is used for

1. Processing
2. Power generation
3. Feedwater heating
4. None of these

**Options :**

- 86435153759. 1
- 86435153760. 2
- 86435153761. 3
- 86435153762. 4

**Question Number : 80 Question Id : 86435115827 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

In a steam power plant, feedwater heater is a heat exchanger to preheat feedwater by

1. Live steam from steam generator
2. Hot flue gases coming out of the boiler furnace
3. Hot air from air preheater
4. extracting steam from turbine

**Options :**

- 86435153763. 1
- 86435153764. 2
- 86435153765. 3
- 86435153766. 4

**Question Number : 81 Question Id : 86435115828 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

In thermal power plants the deaerator is used mainly to

1. Remove air from condenser
2. Reduce steam pressure
3. Increase feedwater temperature
4. Remove dissolved gases from feedwater

**Options :**

- 86435153767. 1
- 86435153768. 2
- 86435153769. 3
- 86435153770. 4

**Question Number : 82 Question Id : 86435115829 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**



Select the correct code

The efficiency of the Vapour Power Rankine Cycle can be increased by

- A. Increasing the temperature of the working fluid at which heat is added
- B. Increasing the pressure of the working fluid at which heat is added
- C. Decreasing the temperature of the working fluid at which heat is rejected

Codes:

- 1. B and C
- 2. A alone
- 3. A and B
- 4. A, B and C

**Options :**

- 86435153771. 1
- 86435153772. 2
- 86435153773. 3
- 86435153774. 4

**Question Number : 83 Question Id : 86435115830 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

The output of a boiler is normally stated as:

- 1. Evaporative capacity in tones of steam that can be produced from water and at 100°C.
- 2. Weight of steam actually produced at rated pressure in tones per hour.
- 3. Boiler horsepower
- 4. Weight of steam produced per kg of fuel.

**Options :**

- 86435153775. 1

86435153776. 2

86435153777. 3

86435153778. 4

**Question Number : 84 Question Id : 86435115831 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Zeroth Law of thermodynamics states that

1. Two thermodynamics systems are always in thermal equilibrium with each other.
2. If two systems are in thermal equilibrium, then the third system will also be in thermal equilibrium.
3. Two systems not in thermal equilibrium with a third system will also not be in thermal equilibrium with each other.
4. When two systems are in thermal equilibrium with a third system, they are in thermal equilibrium with each other.

**Options :**

86435153779. 1

86435153780. 2

86435153781. 3

86435153782. 4

**Question Number : 85 Question Id : 86435115832 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

With increase of pressure, the latent heat of steam

1. Remains same
2. Increases
3. Decreases
4. Behaves unpredictably

**Options :**

86435153783. 1

86435153784. 2

86435153785. 3

86435153786. 4

**Question Number : 86 Question Id : 86435115833 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

When the lower temperature is fixed, COP of a refrigerator machine can be improved by:

1. Operating the machine at higher speeds
2. Operating the machine at lower speeds
3. Raising the higher temperature
4. Lowering the higher temperature

**Options :**

86435153787. 1

86435153788. 2

86435153789. 3

86435153790. 4

**Question Number : 87 Question Id : 86435115834 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A good refrigerant should have:

1. High latent heat of vaporization and low freezing point
2. High operating pressure and low freezing point
3. High specific volume and high latent heat of vaporization
4. Low COP and low freezing point

**Options :**

86435153791. 1

86435153792. 2

86435153793. 3

86435153794. 4

**Question Number : 88 Question Id : 86435115835 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

In a vapour compression refrigeration plant, the refrigerant leaves the evaporation at 195 kJ/kg and condenser at 65 kJ/kg. For every kg of refrigerant the plant can supply per second, a cooling load of

1. 70 kW
2. 100 kW
3. 130 kW
4. 160 kW

**Options :**

86435153795. 1  
86435153796. 2  
86435153797. 3  
86435153798. 4

**Question Number : 89 Question Id : 86435115836 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Waste heat can be effectively used in one of the following system

1. Vapour compression cycle
2. Vapour absorption cycle
3. Air refrigeration cycle
4. Vortex refrigeration system

**Options :**

86435153799. 1  
86435153800. 2  
86435153801. 3  
86435153802. 4

**Question Number : 90 Question Id : 86435115837 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Match List I and List II and select the correct answer using the codes given below the lists

List I	List II
(Refrigerant)	(Principal application)
A. Air	I. Direct contact freezing of food
B. Ammonia	II. Centrifugal compressor system
C. Carbon dioxide	III. Large industrial temperature installation
D. Refrigerant – II	IV. Automatic air-conditioners
	V. Aircraft refrigeration

Choose the **correct** answer from the options given below:

1. A - IV, B - III, C - I, D - II
2. A - V, B - III, C - I, D - II
3. A - II, B - IV, C - III, D - V
4. A - V, B - III, C - II, D - I

**Options :**

- 86435153803. 1
- 86435153804. 2
- 86435153805. 3
- 86435153806. 4

**Question Number : 91 Question Id : 86435115838 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

In milk chilling plants, the usual secondary refrigerant

1. Ammonia solution
2. Sodium silicate
3. Glycol
4. Brine

**Options :**

- 86435153807. 1
- 86435153808. 2
- 86435153809. 3
- 86435153810. 4

**Question Number : 92 Question Id : 86435115839 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

The correct sequence of the components of a vapour compression refrigerator is

1. Evaporation, condenser, compressor, and throttle valve,
2. Condenser, evaporation, throttle valve and compressor
3. Compressor, condenser, throttle valve and evaporation
4. Throttle valve, compressor, evaporation, and condenser

**Options :**

- 86435153811. 1
- 86435153812. 2
- 86435153813. 3
- 86435153814. 4

**Question Number : 93 Question Id : 86435115840 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Experimental measurements on a refrigeration system indicate that rate of heat extraction by the evaporation, rate of heat rejection by the condenser and compressor body to environment are 70 kW, 90 kW and 5 kW respectively. The power input (in kW) required to operate the system is

1. 15
2. 20
3. 25
4. 75

**Options :**

- 86435153815. 1
- 86435153816. 2
- 86435153817. 3
- 86435153818. 4

**Question Number : 94 Question Id : 86435115841 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A refrigerant working on a reversed Carnot cycle has a COP of 4. If it works as a heat pump and consumes 1 kW, the heating effect will be

1. 1 kW
2. 4 kW
3. 5 kW
4. 6 kW

**Options :**

- 86435153819. 1
- 86435153820. 2
- 86435153821. 3
- 86435153822. 4

**Question Number : 95 Question Id : 86435115842 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 1 Wrong Marks : 0**

Air enters an adiabatic nozzle at 300 kPa, 500 K with a velocity of 10 m/s. It leaves the nozzle at 100 kPa with a velocity of 180 m/s. The inlet area is 80 cm<sup>2</sup>. The specific heat of air  $C_p$  is 1008 J/kg K. The exit area of the nozzle in cm<sup>2</sup> is

1. 90.1
2. 56.3
3. 4.4
4. 12.9

**Options :**

- 86435153823. 1
- 86435153824. 2
- 86435153825. 3
- 86435153826. 4

**Question Number : 96 Question Id : 86435115843 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A 2 kW, 40 litres water heater is switched on for 20 minutes. The heat capacity  $C_p$  for water is 4.2 kJ/kg K. Assuming all the electrical energy has gone into heating the water, increase of the water temperature in degree centigrade is

1. 2.7
2. 4.0
3. 14.3
4. 25.25

**Options :**

- 86435153827. 1
- 86435153828. 2
- 86435153829. 3
- 86435153830. 4



**Question Number : 97 Question Id : 86435115844 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

If a closed system is undergoing an irreversible process, the entropy of the system

1. Must increase
2. Always remains constant
3. Must decrease
4. Can increase, decrease or remain constant

**Options :**

- 86435153831. 1
- 86435153832. 2
- 86435153833. 3
- 86435153834. 4

**Question Number : 98 Question Id : 86435115845 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

One kilogram of water at room temperature is brought into contact with a high temperature thermal reservoir. The entropy change of the universe is

1. Equal to entropy change of the reservoir
2. Equal to entropy change of water
3. Equal to zero
4. Always positive

**Options :**

- 86435153835. 1
- 86435153836. 2
- 86435153837. 3
- 86435153838. 4

**Question Number : 99 Question Id : 86435115846 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 1 Wrong Marks : 0**

The ratio of the clearance volume to the displacement volume of a R12 reciprocating compressor is 0.05. Specific volume at inlet and outlet of compressor are  $0.04 \text{ m}^3/\text{kg}$  and  $0.02 \text{ m}^3/\text{kg}$  respectively. Volumetric efficiency of the compressor is

1. 95.0%
2. 47.5%
3. 38.0%
4. 19%

**Options :**

86435153839. 1  
86435153840. 2  
86435153841. 3  
86435153842. 4

**Question Number : 100 Question Id : 86435115847 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

A mixture of gases expands from  $0.03 \text{ m}^3$  to  $0.06 \text{ m}^3$  at a constant pressure of 1 MPa absorbs 84 kJ of heat during the process. The change in internal energy of the mixture is

1. 30 kJ
2. 54 kJ
3. 84 kJ
4. 114 kJ

**Options :**

86435153843. 1  
86435153844. 2  
86435153845. 3  
86435153846. 4