Chettinad College of Engineering & Technology
Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai.

Department of Mechanical Engineering

ME 8693 HEAT AND MASS TRANSFER

Unit II - MCQ Bank

II UNIT-CONVECTION-MCQ Bank

1. Convective heat transfer coefficient doesn't depend on

A. Surface area

B. Space

C. Time

D. Orientation of solid surface

Answer: (A)

2. The rate equation used to describe the mechanism of convection is called Newton's law of cooling. So rate of heat flow by convection doesn't depend on

A. Convective heat transfer coefficient

B. Surface area through which heat flows

C. Time

D. Temperature potential difference

Answer: (C)

3. . How many types of convection process are there?

A. One

B. Three

C. Four

D. Two

Answer: (B)

4. Thermal conductivity is maximum for which substance

A. Silver

B. Ice

C. Aluminum

D. Diamond

Answer: (D)

5. A radiator in a domestic heating system operates at a surface temperature of 60 degree Celsius. Calculate the heat flux at the surface of the radiator if it behaves as a black body

A. 697.2 W/m^2

B. 786.9 W/m^2

C. 324.7 W/m^2

D. 592.1 W/m^2

Answer: (A)

6. Which statement is true regarding steady state condition?

A. There is a variation in temperature in the course of time

B. Heat exchange is constant

C. It is a function of space and time coordinates

D. Internal energy of the system changes

Answer: (B)

7. Which of the following is an example of steady state heat transfer?

A. Boilers and turbines

B. Cooling of I.C engine

C. Chilling effect of cold wind on a warm body

D. Electric bulb cools down by the surrounding atmosphere

Answer: (D)

8. Heat transfer takes place according to which law?

A. Newton's law of cooling

B. Second law of thermodynamics

C. Newton's second law of motion

D. First law of thermodynamics

Answer: (B)

9. Heat transfer takes place in liquids and gases is essentially due to

A. Radiation

B. Conduction

C. Convection

D. Conduction as well as convection

Answer: (C)

10. The appropriate rate equation for convective heat transfer between a surface and adjacent fluid is prescribed by

A. Newton's first law

B. Wein's displacement law

C. Kirchhoff's law

D. Newton's law of cooling

Answer: (D)

11. Identify the wrong statement

A. The process of heat transfer is an irreversible process

B. For heat exchange, a temperature gradient must exist

C. A material medium is not necessary for heat transmission

D. Heat flow doesn't depend on temperature

Answer: (D)

12. Most unsteady heat flow occurs

A. Through the walls of the refrigerator

B. During annealing of castings

C. Through the walls of the furnace

D. Through lagged pipe carrying steam

Answer: (B)

13. The famous Fourier series is named after

A. Diller and Ryan

B. J.B. Joseph Fourier

C. Stefan- Boltzmann

D. Wein's

Answer: (B)

14. Fourier law of heat conduction is best represented by

A. Q = -k A d t /d x

B. Q = k A d x/d t

C. Q = -k A

D. Q = k d t/d x

Answer: (A)

15. Transmission of heat i.e. molecular is smallest in case of

A. Gases

B. Liquids

C. Alloys

D. Solids

Answer: (A)

16. Which of the following is the unit of thermal resistance?

A. degree/kcal

B. hour degree

C. s degree/kcal

D. degree/W

Answer: (D)

17. Which of the following heat flow situations pertains to free or natural convection?

A. Air conditioning installations and nuclear reactors

B. Flow of water inside the condenser tubes

C. Cooling of internal combustion engine

D. Cooling of billets in atmosphere

Answer: (D)

18. Mark the system where heat transfer is given by forced convection

A. Chilling effect of cold wind on warm body

B. Fluid passing through the tubes of a condenser and other heat exchange equipment

C. Heat flow from a hot pavement to surrounding atmosphere

D. Heat exchange on the outside of cold and warm pipes

Answer: (B)

19. Mark the system where heat transfer is given by forced convection

A. Chilling effect of cold wind on warm body

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C. Heat flow from a hot pavement to surrounding atmosphere

D. Heat exchange on the outside of cold and warm pipes

Answer: (A)

20. What is the value of convective coefficient of oil in case of forced convection?

A. 1460-3000 $W/m^2 K$

B. 460-3000 $W/m^2 K$

C. 60-3000 $W/m^2 K$

D. 160-3000 $W/m^2 K$

Answer: (C)

21. Which quantity signifies the ratio of temperature gradient at the surface to a reference temperature gradient?

A. Reynolds number

B. Nusselt number

C. Fourier number

D. Stanton number

Answer: (B)

22. Nusselt number is given by

A. h l/k

B. 2 h l/k

C. 3 h l/k

D. 4 h l/k

Answer: (A)

23. At the interface of solid body, heat flows by conduction and is given by

A. A ($t_s - t_{infinity}$)

B. h A ($t_s - t_{infinity}$)

C. h ($t_s - t_{infinity}$)

D. h A

Answer: (B)

24. For a given value of Nusselt number, the convective surface coefficient h is directly proportional to

A. Length

B. Mass

C. Thermal conductivity

D. Density

Answer: (C)

25. Newton-Rikhman law is given by

A. Q = h A ($t_s - t_f$)

B. Q = 2 h A ($t_s - t_f$)

C. Q = 3 h A ($t_s - t_f$)

D. Q = 4 h A ($t_s - t_f$)

Answer: (A)

26. The value of film coefficient is dependent upon

(i) Boundary layer configuration

(ii) Geometry and orientation of the surface

(iii) Surface conditions

A. i and ii

B. ii and iii

C. i and ii

D. i, ii and iii

Answer: (D)

27. A region of fluid motion near a plate in which temperature gradient exist is

A. Thermal boundary layer

B. Diathermia boundary layer

C. Turbulent flow

D. Laminar flow

Answer: (A)

28. Thermo-physical properties of the fluid are represented by

(i) Density

(ii) Viscosity

(iii) Specific heat

(iv) Thermal conductivity

Identify the correct option

A. i and ii

B. i, ii, iii and iv

C. ii, iii and iv

D. i, ii and iii

Answer: (B)