Online Examination 2020 (SAMPLE Q.P)

Program: BE Chemical Engineering

Examination: Third Year Semester V

Course Code: CHC 503

Course Name: Heat Transfer Operation

Time: 1 hour Max. Marks: 5

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1. In a case of one dimensional heat conduction in a medium with constant properties, *T* is the temperature at position *x*, at time *t*. The HEAT TRANSFER is proportional to:

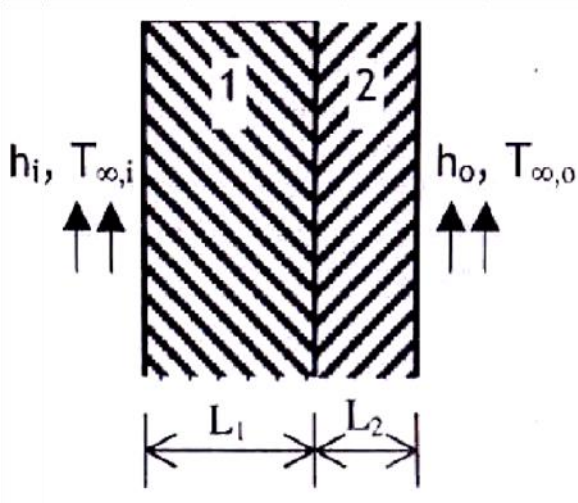
(A) $\frac{T}{X}$

(B) $\frac{\partial \mathrm{T}}{\partial \mathrm{x}}$

(C) $\frac{\partial^2 \mathrm{T}}{\partial \mathrm{x}\,\partial \mathrm{t}}$

(D) $\frac{\partial^2 \mathrm{T}}{\partial^2 \mathrm{x}}$

2. Consider steady-state heat conduction across the thickness in a plane composite wall (as shown in the figure) exposed to convection conditions on both sides.



Given: h_i = 20 W/m^{2}K; h_o = 50 W/m^{2}K; $T_{\infty.i}$ = 20°*C;* $T_{\infty.o}$ = −2°*C;* k_1 = 20 W/mK; K_2 =50W/mK; L_1 = 0.30 m and L_2 = 0.15 m. Assuming negligible contact resistance between the wall surfaces, the interface temperature, T (in °C), of the two walls will be

(A) – 0.50
(B) 2.75
(C) 3.75
(D) 4.50

3. It is proposed to coat a 1 mm diameter wire with enamel paint (k = 0.1 W/mK) to increase heat transfer with air. If the air side heat transfer coefficient is 100 W/m^{2}K, then optimum thickness of enamel paint should be:
(A) 0.25 mm
(B) 0.5 mm
(C) 1 mm
(D) 2 mm

4. Thermal diffusivity of a substance is:
(A) Inversely proportional to thermal conductivity
(B) Directly proportional to thermal conductivity

(C) Directly proportional to the square of thermal conductivity

(D) Inversely proportional to the square of thermal conductivity

5. Heat transfer in liquid and gases takes place by

(A) Conduction
(B) Convection
(C) Radiation
(D) Conduction and convection

6. 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

7. 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

8. what is Nusselt number?

A) C_P. μ/k

B) h. D/k

C) h. C_P/μ

D) C_P. μ/h

9. The ratio of heat flow rate by convection to flow rate by conduction is known as

A) Stanton number

B) Graetz number

C) Fourier number

D) Peclet number

10. Boiling is a--------operation.

A. Convection

B. Conduction

C. Radiation.

D. Drying

11. When heat is added to a liquid from a submerged solid surface, its called

A. Nucleate boiling

B. Film boiling

C. Pool boiling

D. Transition Boiling.

12. Commercial boilers are designed to operate at a temperature drop,

A. Less than Critical Temperature drop.

B. More than critical temperature drop.

C. At critical temperature drop.

D. Infinite critical temperature drop.

13. In which type of boiling the fluid motion is induced by external means?

(A) Forced convection

(B) Pool

(C) Local

(D) Sub-cooled

14. What is the use of fins in heat exchange equipment?

(A) To increase the heat transfer rate

(B) To decrease the heat transfer rate

(C) To keep constant heat transfer rate

(D) To decrease heat transfer ar

15. Which of the following has the lowest overall heat transfer coefficient?

(A) Air

(B) Molten sodium

(C) Water

(D) Dowtherm

16. Double pipe heat exchangers are used

(A) When heat transfer area required is very high.

(B) When heat transfer area required is very low.

(C) Because it occupies less floor area.

(D) Because it is less costly.

17. Tube side temperature in a shell and tube heat exchanger is normally measured by a

(A) constant volume hydrogen thermometer

(B) mercury in glass thermometer

(C) thermocouple

(D) radiation pyrometer

18. In shell and tube heat exchanger, the shortest centre to centre distance between the adjacent tubes is

(A) called tube pitch

(B) called tube clearance

(C) is always less than diameter of tube

(D) baffle spacing

19. The value of transmissivity may vary from

A) 0-1

B) 1-2

C) 3-4

D) 4-5

20. Of the radiant energy 350W/m^2 incident upon a surface 250W/m^2 is absorbed, 60W/m^2 is reflected and the remainder is transmitted through the surface. Workout the value for absorptivity for the surface material

A) 0-1

B) 1-2

C) 3-4

D) 4-5

21. Transmissivity is defined as

A) Fraction of total energy transmitted by the body

B) Fraction of total energy reflected by the body

C) Fraction of total energy absorbed by the body

D) Fraction of total energy absorbed and radiated by the body