Program: BE Mechanical Engineering

Curriculum Scheme: Revised 2012

Examination: Third Year Semester V

Course Code: MEC505 and Course Name: Heat Transfer

Time: 1 hour Max. Marks: 50

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Note to the students: - All the Questions are compulsory and carry equal marks.

Q1.	A radiator in a domestic heating system operates at a surface temperature of 60 degree Celsius. Calculate the heat flux in W/m^2 at the surface of the radiator if it behaves as a black body
Option A:	697.2
Option B:	786.9
Option C:	324.7
Option D:	592.1
Q2.	Heat transfer takes place according to which law?
Option A:	Newton's law of cooling
Option B:	Second law of thermodynamics
Option C:	Newton's second law of motion
Option D:	First law of thermodynamics
Q3.	Absorptivity and reflectivity of a perfect black body are respectively
Option A:	1 and 0
Option B:	0 and 1
Option C:	1 and ∞
Option D:	0 and 0.5
Q4.	**In case of heat flow by conduction for a cylindrical body with an internal heat source, the nature of temperature distribution is**
Option A:	Linear
Option B:	Hyperbolic
Option C:	Parabolic
Option D:	logarithmic
Q5.	**. If the body or element does not produce heat, then the general heat conduction equation which gives the temperature distribution and conduction heat flow in an isotropic solid reduces to** $(\partial T/\partial x^2) + (\partial T/\partial y^2) + (\partial T/\partial z^2) = (1/\alpha)(\partial T/\partial t)$ **this equation is known as**
Option A:	Laplace equation

Option B:	Fourier equation
Option C:	Poisson equation
Option D:	Binomial equation
Q6.	**In which mode of heat transfer, the Biot number is important?**
Option A:	Transient heat conduction
Option B:	Natural convection
Option C:	Forced convection
Option D:	Radiation
Q7.	**The Fourier number (defined as a.t/L2) is used in the analysis of problem involving heat transfer by**
Option A:	Forced convection
Option B:	Natural convection
Option C:	Transient conduction
Option D:	Steady state conduction
Q8.	For a Lumped capacitance model in unsteady heat transfer
Option A:	The internal Temperature gradient (ITG) must be 0
Option B:	The internal Temperature gradient (ITG) must be greater than 0
Option C:	The internal Temperature gradient (ITG) must be less than 0
Option D:	There is no such model
Q9.	The Temperature distribution for an infinite length fin is given as , where the symbols have their usual meaning
Option A:	$\theta(x) = \theta_b e^{-(mx)}$
Option B:	$\theta(x) = \theta_b e^{-(x)}$
Option C:	$\theta(x) = \theta_b$
Option D:	$\theta(x) = \theta_b e^{-(mx^2)}$
Q10.	In order to measure temperature of a fluid flowing in a pipe a cylindrical fitting is used in which the measurement instrumentation is used, is known as
Option A:	Expansion
Option B:	T Joint
Option C:	Thermowell
Option D:	Multimeter
Q11.	Time constant for a thermocouple is given as
Option A:	$\tau = \frac{\rho . V . C}{h . A_s}$
Option B:	$\tau = \frac{\rho}{h . A_s}$

Option C:	$\tau = \frac{VC}{h.A_s}$
Option D:	$\tau = \frac{C}{h.A_s}$
Q12.	The flow is said to be turbulent flow in which the fluid particles move
Option A:	Well defined paths
Option B:	stream lines
Option C:	Zig – Zag way
Option D:	Both zig – zag and steam lined motion.
Q13.	The Grashof number in natural convection plays same role as
Option A:	Prandtl number (Pr) in forced convection
Option B:	Reynolds number (Re) in forced convection
Option C:	Nusselt number (Nu) in forced convection
Option D:	Peclet number (Pe) in forced convection
Q14.	Fraction of radiative energy leaving one surface that strikes the other surface is called?
Option A:	Radiative flux
Option B:	Emissive power of first surface
Option C:	View factor
Option D:	Reradiating flux
Q15.	The emissivity for a black body is?
Option A:	0
Option B:	0.5
Option C:	1
Option D:	0.75
Q16.	Two radiating surface A_1=6 m^2 and A_2=4 m^2 have the shape factor F_{1-2}=0.1; the shape factor F_{2-1}?
Option A:	0.18
Option B:	0.15
Option C:	0.12
Option D:	0.10
Q17.	What is the the shape factor of a hemispherical body placed on flat surface with respect to itself?
Option A:	zero
Option B:	0.25
Option C:	0.5

Option D:	1
Q18.	Stefen Boltzmann law is applicable to?
Option A:	Grey body
Option B:	White body
Option C:	Black body
Option D:	Opaque body
Q19.	According to Stefan Boltzmann the total radiations from a black body per second per unit area is proportional to?
Option A:	T
Option B:	T^2
Option C:	T^3
Option D:	T^4
Q20.	The total radiation leaving a surface per unit time per unit surface area is called as?
Option A:	Radiosity
Option B:	Irradiosity
Option C:	Irradiation
Option D:	Reflection
Q21.	In the film established along a vertical plate during condensation of any vapour over the plates, the temperature distribution curve is
Option A:	Concave upwards
Option B:	Concave downwards
Option C:	Parabolic
Option D:	Straight line
Q22.	A Counter flow heat exchanger is used to heat water from 20^0C to 80^0C by using hot exhaust gas entering at 140^0C & leaving at 80^0C. the log mean temperature difference for the heat exchanger is
Option A:	80^0C
Option B:	60^0C
Option C:	110^0 C
Option D:	not determinable as zero / zero is involved
Q23.	A designer chooses the values of fluid flow ranges and specific heats in such a manner that the heat capacities of the two fluids are equal. A hot fluid enters the counter flow heat exchanger at 100^0C and leaves at 60^0C, The cold fluid enters the heat Exchanger at 40^0C. The mean temperature difference between the two fluids is
Option A:	$(100 + 60 + 40) / 3$ ^{0}C
Option B:	60^0C
Option C:	40^0C
Option D:	20^0C

Q24.	The engine oil at 150^0C is cooled to 80^0C in a parallel flow heat exchanger by water entering at 25^0C and leaving at 60^0C. The number of transfer units (NTU) will be
Option A:	1
Option B:	1.2
Option C:	1.6
Option D:	2.0
Q25.	The average temperature difference between the two fluids in case of counterflow heat exchanger as compared to parallel flow heat exchanger is
Option A:	more
Option B:	less
Option C:	same
Option D:	unpredictable