University of Mumbai
Examination 2020 under cluster 5 (APSIT)

Program: BE Mechanical Engineering

Curriculum Scheme: Revised 2016/2012

Examination: Third Year   Semester: V

Course Code: MEC503 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.	If the temperature of solid surface changes from 27 °C to 627 °C, then its emissive power changes in the ratio of
Option A:	3
Option B:	9
Option C:	27
Option D:	81
Q2.	A marble tile would feel cold as compared to a wooden tile on a winter morning. Because the marble tile
Option A:	Is a better conductor of heat than the wooden tile
Option B:	Is polished while wooden tile is not polished
Option C:	Reflects more heat than wooden tile
Option D:	Is a poor conductor of heat the wooden tile
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.	Unit of the rate of heat transfer is
Option A:	Joule
Option B:	Newton
Option C:	Pascal
Option D:	Watt
Q5.	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

Q6.	Regarding one dimensional heat transfer, choose the correct statement
Option A:	Steady – f (x), Unsteady – f (x, t)
Option B:	Steady – f (x,t), Unsteady – f (x)
Option C:	Steady – f (x, y, t), Unsteady – f (x)
Option D:	Steady – f (y, z), Unsteady – f (y)
Q7.	Thermal conductivity of air with rise in temperature
Option A:	Increases
Option B:	Decreases
Option C:	Remains constant
Option D:	May increase or decrease depending on temperature
Q8.	If the thermal conductivity of a wall material is independent of temperature, the steady state temperature distribution in the very large thin plane wall having steady, uniform surface temperature follows ………… law
Option A:	Parabolic
Option B:	Hyperbolic
Option C:	Linear
Option D:	Logarithmic
Q9.	Calculate the rate of heat transfer per square meter of the surface of a cork board having 5 cm thickness, and a temperature difference of 75 oC is applied across the board. The value of thermal conductivity (k) is 0.4 W/mC
Option A:	100 W
Option B:	120 W
Option C:	130 W
Option D:	150 W
Q10.	The mode of heat transfer in a fin is by
Option A:	Conduction only
Option B:	Convection only
Option C:	Radiation
Option D:	Both conduction along length and convection along the periphery
Q11.	For Lumped capacitance model the criterion to be satisfied is
Option A:	Bi > 10
Option B:	Bi > 1.0
Option C:	Bi <0.1
Option D:	Bi > 0
Q12.	Convective heat transfer takes place between a fluid and a solid surface
Option A:	While the fluid is stationary
Option B:	While the fluid is in motion
Option C:	Fluid does not play any role in convective heat transfer

Option D:	It is the type of solid on which it depends
Q13.	A metal plate 4 m X 2 m is at a temperature of 80˚C and is kept in the atmosphere air whose temperature is at 30˚C. Calculate the heat transfer rate by convection, if the convection coefficient is 5.0 W/m2˚C
Option A:	2500 W
Option B:	2000 W
Option C:	1500 W
Option D:	3000 W
Q14.	Total emissivity of polished silver compared to black body is?
Option A:	Same
Option B:	Higher
Option C:	More or less
Option D:	Very less
Q15.	Ice is very close to a?
Option A:	Gray body
Option B:	Black body
Option C:	White body
Option D:	Specular body
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.	In a heat Exchanger, the hot liquid enters with a temperature of 180 0C & leaves at 160 0C. The cooling fluid enters at 30 0C and leaves at 110 0C. The capacity ratio of heat exchanger is
Option A:	0.25
Option B:	0.40
Option C:	0.50
Option D:	0.55
Q18.	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
Q19.	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 oC
Option B:	60 oC
Option C:	110 oC
Option D:	not determinable as zero / zero is involved
Q20.	The multiple pass heat exchangers are used to
Option A:	increase the rate of heat transfer
Option B:	reduce pressure drop
Option C:	increase pressure drop
Option D:	reduce fluid flow friction losses
Q21.	Thermal conductivity is maximum for which substance
Option A:	Silver
Option B:	Ice
Option C:	Aluminium
Option D:	Diamond
Q22.	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
Q23.	What is the unit of overall heat transfer coefficient?
Option A:	W / mK
Option B:	W/m^2K
Option C:	N / m^2
Option D:	W/S
Q24.	A beggar wrapped himself with a few layers of newspaper on a cold winter night. This helped him to keep himself warm because
Option A:	Friction between the layers of newspaper produces heat
Option B:	Air trapped between the layers of newspaper is a bad conductor of heat.
Option C:	Newspaper is a conductor of heat
Option D:	Newspaper is at a higher temperature than the temperature of the surrounding
Q25.	Unsteady state heat conduction occurs, when
Option A:	Temperature distribution is independent of time
Option B:	Temperature distribution is dependent on time
Option C:	Heat flows in one direction only
Option D:	Three dimensional heat flow is concerned