Program: BE Mechanical Engineering

Curriculum Scheme: Revised 2016

Examination: Third Year Semester V

Course Code: MEC503and Course Name: Heat Transfer

Time: 1hour Max. Marks: 50

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

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| Q1.  | Unit of thermal conductivity in M.K.S. units is |
| Option A: | kcal/kg m2 °C |
| Option B: | kcal-m/hr m2 °C |
| Option C: | kcal/hr m2 °C |
| Option D:  | kcal-m/hr °C |
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| Q2. | 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/$m^{2/}K$;  ;  $K\_{1}=20W/mK$; $K\_{2}=50W/mK; T\_{\infty ,i}=20$;$T\_{\infty ,o}=-2℃$;   $L\_{1}=0.30m$ and $L\_{2}=0.15m$Assuming negligible contact resistance between the wall surfaces, the interface temperature , in T($℃$), of the two walls will be |
| Option A: | -0.50 |
| Option B: | 2.75 |
| Option C: | 3.75 |
| Option D: | 4.50 |
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| Q3. | Thermal conductivity of solid metals with rise in temperature normally |
| Option A: | Increases |
| Option B: | Decreases |
| Option C: | remains constant |
| Option D: | may increase or decrease depending on temperature |
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| Q4. |  The rate of heat conduction through a cylindrical tube is usually expressed as  |
| Option A: | Per unit length |
| Option B: | Per unit area |
| Option C: | Only area  |
| Option D: | Only length |
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| Q5. | Heat transfer takes place as per – |
| Option A: | zeroth law of thermodynamics |
| Option B: | first law of thermodynamic |
| Option C: |  second law of the thermodynamics |
| Option D:  | Kirchoff’s law (e) Stefan’s law. |
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| Q6. | The amount of heat flow through a body by conduction is |
| Option A: | directly proportional to the surface area of the body |
| Option B: | directly proportional to the temperature difference on the two faces of the body |
| Option C: | inversely proportional to the thickness of the body |
| Option D:  | all of the above |
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| Q7.  | LMTD in case of counter flow heat exchanger as compared to parallel flow heat exchanger is |
| Option A: | Higher  |
| Option B: | Lower  |
| Option C: | Same |
| Option D:  | Depends on area of Heat Exchanger |
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| Q8.  | In heat exchangers, degree of approach is defined as the difference between temperatures of |
| Option A: | Cold water inlet and outlet |
| Option B: | Hot medium inlet and outlet |
| Option C: | Hot medium outlet and cold water inlet |
| Option D:  | Hot medium outlet and cold water outlet |
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| Q9. |  A composite wall of a furnace has two layers of equal thickness having thermal conductivities in the ratio 2:3. What is the ratio of the temperature drop across the two layers?  |
| Option A: | 2:3 |
| Option B: | 3:2 |
| Option C: | 1:3 |
| Option D:  | Loge 2:loge3 |
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| Q10.  | The thermal resistance for heat conduction through a spherical wall is |
| Option A: | (r2-r1)/2πkr1r2 |
| Option B: | (r2-r1)/3πkr1r2 |
| Option C: | (r2-r1)/πkr1r2 |
| Option D:  | (r2-r1)/4πkr1r2 |
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| Q11.  | The automobile radiator is a heat exchanger of |
| Option A: | Parallel flow type |
| Option B: | Counter flow type |
| Option C: | Cross flow type |
| Option D:  | Regenerator type |
|  |  |
| Q12.  | Which of the following would lead to a reduction in thermal resistance? |
| Option A: | In conduction, reduction in the thickness of the material and an increase in thermal conductivity. |
| Option B: | In convection, stirring of the fluid and cleaning the heating surface. |
| Option C: | In radiation, increasing the temperature and reducing the emissivity. |
| Option D: | All of the above |
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| Q.13 | The transfer of heat by molecular collision is smallest in |
| Option A: | Solids |
| Option B: | Gases |
| Option C: | Liquids |
| Option D:  | semisolid |
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| Q14.  | Temperature at the end tip of the fin having uniform cross-sectional area is |
| Option A: | maximum |
| Option B: | minimum  |
| Option C: | similar to the heat generation temperature |
| Option D:  | unpredictable |
|  |  |
| Q15. | In the process of heat transfer through extended surfaces or fins, the entire surface area is at |
| Option A: | the same constant temperature |
| Option B: | different temperatures |
| Option C: | maximum base temperature |
| Option D:  | minimum temperature |
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| Q16.  | Generally the external thermal resistance between the surface of the body and the environment is |
| Option A: |  less than the internal conduction resistance in the body |
| Option B: |  more than the internal conduction resistance in the body  |
| Option C: |  same as the internal conduction resistance in the body |
| Option D:  | none of the above |
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| Q17. | The value of Prandtl number for air is about |
| Option A: | 0.1 |
| Option B: | 0.3 |
| Option C: | 0.7 |
| Option D: | 1.3 |
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| Q18. | What should be the Biot number to assume the body at uniform temperature? |
| Option A: | Biot number should be less than 0.1  |
| Option B: | Biot number should be more than 0.1 |
| Option C: | Biot number should be equal to 0.1 |
| Option D:  | Biot number should be 0.3 |
|  |  |
| Q19.  | The emissive power of a body depends upon its |
| Option A: | temperature |
| Option B: | wave length |
| Option C: |  physical nature |
| Option D:  | Colour |
|  |  |
| Q20. | Absorptivity of a body will be equal to its emissivity |
| Option A: |  at all temperatures |
| Option B: |  at one particular temperature |
| Option C: | when system is under thermal equi-librium |
| Option D: |  at critical temperature |
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| Q21. | The product of Reynolds number and Prandtl number is known as |
| Option A: | Stanton number |
| Option B: | Biot number |
| Option C: | Peclet number |
| Option D:  | Grashoff number |
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| Q22. | The velocity profile of the hydrodynamic boundary layer is dependent upon |
| Option A: | Time  |
| Option B: | Viscosity |
| Option C: | Temperature |
| Option D:  | Mass |
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| Q23. | The total emissivity power is .defined as the total amount of radiation emitted by a black body per unit |
| Option A: | temperature |
| Option B: | thickness |
| Option C: | area |
| Option D:  | time |
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| Q24. | **The heat is absorbed by** |
| Option A: | Condenser |
| Option B: | Evaporator |
| Option C: | Compressor |
| Option D:  | Thermostat |
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| Q25. | **In heat exchangers, the value of logarithmic mean temperature difference should be** |
| Option A: | maximum possible |
| Option B: | minimum possible |
| Option C: | Zero  |
| Option D:  | constant |