**These are sample MCQs to indicate pattern, may or may not appear in examination**

# University of Mumbai

## Examination 2020

Program: BE Mechanical Engineering

Curriculum Scheme: Revised 2016

Examination: Third Year Semester V

Course Code: MEC503 and Course Name: Heat Transfer

Time: 1hour Max. Marks: 50

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

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| Q1. | Use of external force for flow is done in |
| Option A: | Free convection |
| Option B: | Free conduction |
| Option C: | Forced Radiation |
| Option D: | Forced Convection |
| | |
| Q2. | Emissivity of Black Body is |
| Option A: | 0.5 |
| Option B: | 2 |
| Option C: | 1 |
| Option D: | 0 |
| | |
| Q3. | Transmissivity of Opaque body is |
| Option A: | 2 |
| Option B: | 1 |
| Option C: | 0.9 |
| Option D: | 0 |
| | |
| Q4. | The value of critical radius in case of a cylindrical hollow object is |
| Option A: | 2k/h |
| Option B: | 2h/k |
| Option C: | k/h |
| Option D: | h/k |
| | |
| Q5. | For insulation to be properly effective in restricting heat transmission, the pipe radius r0 will be |
| Option A: | Less than critical radius |
| Option B: | Greater than critical radius |
| Option C: | Greater than or equal to critical radius |
| Option D: | Equal to critical radius |
| | |
| Q6. | Chose the correct one with respect to the critical radius of insulation |

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| Option A: | There is more heat loss i.e. conductive |
| Option B: | There occurs a decrease in heat flux |
| Option C: | Heat loss increases with addition of insulation |
| Option D: | Heat loss decreases with addition of insulation |
| | |
| Q7. | Heat is lost at a rate of 275 W per sq. m area of a 15-cm thick wall with a thermal conductivity of k 5 1.1 W/m·K. The temperature drop across the wall is |
| Option A: | 37.5 degree Celsius |
| Option B: | 27.5 degree Celsius |
| Option C: | 16 degree Celsius |
| Option D: | 8 degree Celsius |
| | |
| Q8. | In the lumped system parameter model, the variation of temperature with time is |
| Option A: | Linear |
| Option B: | Exponential |
| Option C: | Sinusoidal |
| Option D: | Cubic |
| | |
| Q9. | Which of the following dimensionless number gives an indication of the ratio of internal (conduction) resistance to the surface (convective) resistance? |
| Option A: | Biot number |
| Option B: | Fourier number |
| Option C: | Stanton number |
| Option D: | Nusselt number |
| | |
| Q10. | Lumped parameter analysis for transient heat conduction is essentially valid for |
| Option A: | $Bi < 0.1$ |
| Option B: | $1 < Bi < 10$ |
| Option C: | $0.1 < B_i < 0.5$ |
| Option D: | It tends to infinity |
| | |
| Q11. | In the non-dimensional Biot number, the characteristics length is the ratio of |
| Option A: | Perimeter to surface area of solid |
| Option B: | Surface area to perimeter of solid |
| Option C: | Surface area to volume of solid |
| Option D: | Volume of solid to its surface area |
| | |
| Q12. | Peclet number (Pe) is given by |
| Option A: | Pe = Re.Pr |
| Option B: | Pe = Re/Pr |
| Option C: | Pe = Pr /Re (D) |
| Option D: | Pe = Nu.Re |
| | |
| Q13. | Heat transfer co-efficient equation for forced convection, Nu = 0.023 Re 0.8 . Pr n , is not valid, if the value of |

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| Option A: | n = 0.4 is used for heating |
| Option B: | n = 0.3 is used for cooling |
| Option C: | Reynolds number for the flow involved is > 10000 |
| Option D: | Reynolds number for the flow involved is < 2100 |
| | |
| Q14. | Which of the following is directly concerned with the convection heat transfer? |
| Option A: | Strouhal number |
| Option B: | Sherwood number |
| Option C: | Euler number |
| Option D: | Grashoff number |
| | |
| Q15. | For a laminar flow of fluid in a circular tube, 'h1' is the convective heat transfer co-efficient at velocity 'V1'. If the velocity is reduced by half and assuming the fluid properties are constant, the new convective heat transfer co-efficient is |
| Option A: | 1.26 h1 |
| Option B: | 0.794 h1 |
| Option C: | 0.574 h1 |
| Option D: | 1.741 h1 |
| | |
| Q16. | Which of the following is an example of lump system analysis? |
| Option A: | Heating or cooling of fine thermocouple wire due to change in ambient temperature |
| Option B: | Heating of an ingot in an furnace |
| Option C: | Cooling of bars |
| Option D: | Cooling of metal billets in steel works |
| | |
| Q17. | Pick out the wrong statement. |
| Option A: | The emissivity of a surface decreases, if it gets corroded by atmospheric environment |
| Option B: | The emissivity of a surface increases with increase in surface roughness |
| Option C: | The emissivity of a polished surface is quite low |
| Option D: | The emissivity of a non-metallic surface decreases with increase in the temperature |
| | |
| Q18. | The absorptivity of a body is equal to its emissivity |
| Option A: | At a particular temperature |
| Option B: | For circular bodies |
| Option C: | For smooth surfaces |
| Option D: | Under thermal equilibrium |
| | |
| Q19. | Stefan-Boltzmann law applies to _____ body. |
| Option A: | Black |
| Option B: | White |
| Option C: | Grey |
| Option D: | Any colour |
| | |

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| Q20. | The rate of energy radiated per unit area of the surface per unit wavelength is known as |
| Option A: | Spectral emissive power |
| Option B: | Emissive power |
| Option C: | Intensity of radiation |
| Option D: | Radiosity |
| | |
| Q21. | For the same inlet and exit temperatures of two fluids, the LMTD for counterflow is always ……. |
| Option A: | smaller than LMTD for parallel flow |
| Option B: | greater than LMTD for parallel flow |
| Option C: | same as LMTD for parallel flow |
| Option D: | unpredictable |
| | |
| Q22. | In heat exchangers, the value of logarithmic mean temperature difference should be …… |
| Option A: | maximum |
| Option B: | minimum |
| Option C: | constant |
| Option D: | zero |
| | |
| Q23. | A heat pipe functions as ……. |
| Option A: | Medium for converting thermal energy to electrical energy |
| Option B: | Heat sink for electronic products |
| Option C: | Transport thermal energy from a hot location to a cooler location |
| Option D: | Transport water from a hot location to a cooler location |
| | |
| Q24. | Power rating of a heat pipe ……. |
| Option A: | Increases with length |
| Option B: | Decreases with length |
| Option C: | Is independent of length |
| Option D: | Effect of length depends on fluid used |
| | |
| Q25. | A gold ring (k = 65 W/m K) of length 15 cm is exposed to a surface where h = 11.5 W per sq. m pr K. Find the value of Biot number is |
| Option A: | 0.0265 |
| Option B: | 0.0625 |
| Option C: | 0.265 |
| Option D: | 0.652 |