

## Electrical Heating MCQ PDF

### **1. A perfect black body is one which**

- (a) absorbs all incident radiations.
- (b) reflects all incident radiations.
- (c) transmits all incident radiations.
- (d) all of the above.

**Answer: (a) absorbs all incident radiations.**

### **2. For the transmission of heat from one body to another it is essential that**

- (a) both bodies are solids.
- (b) the two bodies are at different temperatures.
- (c) both bodies are in contact.
- (d) at least one of the bodies has some source of heating.

**Answer: (b) the two bodies are at different temperatures.**

### **3. Heat is transferred simultaneously by conduction, convection and radiation**

- (a) during melting of ice.
- (b) from refrigerator coils to refrigerator freezer.
- (c) inside boiler furnaces.

(d) through the surface of the insulated pipe carrying steam.

**Answer: (c) inside boiler furnaces.**

**4. The highest value of thermal conductivity is for**

(a) aluminium.

(b) brass.

(c) copper.

(d) iron.

**Answer: (c) copper.**

**5 The highest value of thermal conductivity is for**

(a) steam.

(b) water.

(c) melting ice.

(d) solid ice.

**Answer: (d) solid ice.**

**6. The thermal conductivity will be highest in case of (a) dry concrete.**

(b) concrete having 10% moisture by volume.

(c) concrete having 0.4% reinforcement.

(d) concrete having 10% moisture by volume and 0.4% reinforcement.

**Answer: (d) concrete having 10% moisture by volume and 0.4% reinforcement.**

**7. Radiations from a black body are proportional to**

(a)  $T^2$

(b)  $T^3$

(c)  $T^4$

(d)  $1/T^4$

**Answer: (c)  $T^4$**

**8. A body reflecting entire radiations incidenting on it is called the**

(a) white body.

(b) gray body.

(c) black body.

(d) transparent body.

**Answer: (a) white body.**

**9. The insulating material suitable for low temperature applications is**

(a) cork.

- (b) diatomaceous earth.
- (c) asbestos paper.
- (d) 75 percent magnesia.

**Answer: (b) diatomaceous earth.**

**10. The quantity of heat absorbed from the heater by convection depends upon**

- (a) the temperature of heating element above the surroundings.
- (b) the surface area of the heater.
- (c) the position of the heater.
- (d) all of the above.

**Answer: (d) all of the above.**

**11. The material of the heating element should be**

- (a) such that it may withstand the required temperature without getting oxidized.
- (b) of low resistivity.
- (c) of low melting point.
- (d) of high temperature coefficient.

**Answer: (a) such that it may withstand the required temperature without getting oxidized.**

**12. The material to be used for heating element should be of high resistivity so as to**

- (a) increase the life of the heating element.
- (b) reduce the length of the heating element.
- (c) reduce the effect of oxidation.
- (d) produce large amount of heat.

**Answer: (b) reduce the length of the heating element.**

**13. The material to be used for heating element should be of low temperature coefficient so as to**

- (a) avoid initial rush of current.
- (b) avoid change in kW rating with temperature.
- (c) reduce the effect of oxidation.
- (d) both (a) and (b) above.

**Answer: (d) both (a) and (b) above.**

**14. Which of the following heating element will have the least temperature range ?**

- (a) Eureka.
- (b) Silicon carbon.
- (c) Nichrome.

(d) Kanthal.

**Answer: (a) Eureka.**

**15. Which of the following heating element can give highest temperature in resistance heating ?**

(a) Nichrome.

(b) Silicon carbide.

(c) Copper.

(d) Nickel-Cr-Fe alloy.

**Answer: (a) Nichrome.**

**16. Ni-Cr-Fe alloy wires can be safely used for temperatures up to**

(a) 2,500°C

(b) 2,000°C

(c) 1,150°C

(d) 850°C

**Answer: (d) 850°C**

**17. The heating element to be used in a furnace employed for heating around, 1,600°C should be of material**

(a) nichrome.

- (b) eureka.
- (c) molybdenum.
- (d) silicon-carbide.

**Answer: (c) molybdenum.**

**18. For radiant heating around 2,000°C the heating elements used should be of material**

- (a) tungsten alloy.
- (b) copper alloy.
- (c) carbon.
- (d) stainless steel

**Answer: (a) tungsten alloy.**

**19. The heating element to be used in vacuum furnaces should be of the material**

- (a) molybdenum because of high vapor pressure.
- (b) tungsten because of low vapor pressure.
- (c) molybdenum because of low vapor pressure.
- (d) tungsten because of high vapor pressure.

**Answer: (b) tungsten because of low vapor pressure.**

**20. In an electric press, mica is used**

- (a) for induction heating.
- (b) for dielectric heating.
- (c) as an insulator.
- (d) for improvement of power factor.

**Answer: (c) as an insulator.**

**21. Maximum operating voltage is limited**

- (a) to 600 V.
- (b) from safety consideration.
- (c) by electrical insulation at high temperatures.
- (d) all of the above.

**Answer: (d) all of the above.**

**22. The heat produced in the heating element(s) is also to overcome the losses occurring because of**

- (a) heat used in raising the temperature of oven (or furnace) and container (or carriers).
- (b) heat conducted through the walls.
- (c) escapement of heat due to opening of door.
- (d) all of the above.



**Answer: (d) all of the above.**

**23. In a resistance furnace, the temperature is controlled by**

- (a) variation of operating voltage.
- (b) variation of resistance of heating circuit.
- (c) switching on and off the supply periodically.
- (d) all of the above.

**Answer: (d) all of the above.**

**24. For temperature control in resistance furnaces resistance variation can be affected by connecting resistance elements in**

- (a) series.
- (b) parallel.
- (c) series parallel.
- (d) star or delta.
- (e) any of the above.

**Answer: (e) any of the above.**

**24. The simplest and most commonly used method for temperature control is**

- (a) external series resistance in the heating circuit.
- (b) change of connections of heating circuit.
- (c) use of variable number of heating elements.

(d) transformer tappings.

**Answer: (b) change of connections of heating circuit.**

**25. The device necessarily used for automatic temperature control in a furnace is**

(a) thermostat.

(b) auto-transformer.

(c) thermocouple.

(d) any of the above.

**Answer: (a) thermostat.**

**26. Control of power input to salt-bath furnace is affected by**

(a) varying the depth of immersion of electrodes.

(b) varying the distance between the electrodes.

(c) both (a) and (b).

(d) none of (a) and (b).

**Answer: (c) both (a) and (b).**

**27 The temperature inside a furnace is usually measured by**

(a) mercury thermometer.

(b) optical pyrometer.

(c) alcohol thermometer.

(d) any of the above.

**Answer: (b) optical pyrometer.**

**28. In a resistance furnace the atmosphere is**

(a) oxidizing.

(b) deoxidizing.

(c) reducing.

(d) neutral.

**Answer: (a) oxidizing.**

**29. On increasing the thickness of refractory walls of the furnace**

(a) energy consumption will increase.

(b) heat loss through furnace walls will increase.

(c) temperature on the outer surface of furnace walls will drop.

(d) temperature inside the furnace will drop.

**Answer: (c) temperature on the outer surface of furnace walls will drop.**

**30. Radiant heating is used for**

(a) melting of ferrous metals.

- (b) annealing of metals.
- (c) drying of paints and varnishes.
- (d) any of the above.

**Answer: (c) drying of paints and varnishes.**

### **31. Direct resistance heating is used in**

- (a) electrode boiler.
- (b) salt-bath furnace.
- (c) resistance welding.
- (d) all of the above.

**Answer: (d) all of the above.**

### **32. Resistance ovens are used for**

- (a) domestic and commercial heating.
- (b) vulcanizing and hardening of synthetic materials.
- (c) drying of varnish coatings, drying and baking of potteries.
- (d) all of the above.

**Answer: (d) all of the above.**

**33. The function(s) of an heating chamber is are to**

- (a) store as much of the heat supplied as may be practicable and economical.
- (b) confine the atmosphere around the charge.
- (c) control the cooling rate of the charge (if required) and control the distribution of heat within the chamber.
- (d) all of the above.

**Answer: (d) all of the above.**

**34. For obtaining best results, the infrared lamps should be located from the object to be heated at distance of**

- (a) 10 - 20 cm.
- (b) 25 - 30 cm.
- (c) 40 - 50 cm.
- (d) 50 - 60 cm.

**Answer: (b) 25 - 30 cm.**

**35. In direct arc furnace which of the following is of high value ?**

- (a) Current.
- (b) Voltage.
- (c) Power factor.
- (d) all of the above.

**Answer: (a) Current.**

**36. The power factor at which the direct arc furnace operates is**

(a) low lagging.

(b) low leading.

(c) unity.

(d) high leading.

**Answer: (a) low lagging.**

**37. For arc heating the electrodes used are made of**

(a) copper.

(b) graphite.

(c) tungsten.

(d) aluminum.

**Answer: (b) graphite.**

**38. In an arc furnace, the choke is provided to**

(a) reduce the surge severity.

(b) stabilize the arc.

(c) improve the power factor.

(d) all of the above.

**Answer: (b) stabilize the arc.**

**39. It is desirable to operate the arc furnaces at a power factor of**

- (a) zero.
- (b) unity.
- (c) 0.707 lagging.
- (d) 0.707 leading.

**Answer: (c) 0.707 lagging.**

**40. It is desirable to keep the arc length short in order to**

- (a) have better heating.
- (b) have better stirring action and reduce oxidation problem.
- (c) increase the life of roof refractory.
- (d) all of the above.

**Answer: (d) all of the above.**

**41. Arc drawn between the two electrodes produces heat and has a temperature**

- (a) between 0 - 600°C.
- (b) between 500°C - 1,000°C.
- (c) between 1,000°C - 3,500°C.

(d) of the order of 4,000°C.

**Answer: (c) between 1,000°C - 3,500°C.**

**42. The arc furnaces of conical shapes have the advantage(s) of**

(a) large surface area per unit bath volume.

(b) low power consumption.

(c) reduced radiation losses.

(d) all of the above.

**Answer: (d) all of the above.**

**43. In arc furnace, energy losses that take place in the furnace are**

(a) losses through walls.

(b) losses through escape gasses.

(c) losses through water cooling.

(d) all of the above.

**Answer: (d) all of the above.**

**44. In submerged arc furnaces the power is controlled by**

(a) varying the spacing between the electrodes.

(b) varying the voltage applied to the electrodes.



(c) either (a) or (b).

(d) varying the arc length.

**Answer: (c) either (a) or (b).**

**45. For arc furnaces the low voltage high current power supply is needed because**

(a) heavy currents produce large amount of heat resulting in higher temperatures.

(b) maximum secondary voltage is also limited to 275 V (line-to-line on open circuit) owing to insulation and safety consideration.

(c) life of the roof refractory is increased.

(d) all of the above.

**Answer: (d) all of the above.**

**46. The main application of indirect arc furnace is to melt**

(a) iron.

(b) steel.

(c) non-ferrous metals.

(d) none of the above.

**Answer: (c) non-ferrous metals.**

**47. For power transformers employed for arc furnaces, it is desirable to arrange the furnace and the transformer in such a way that leads are**

- (a) shorter in length and placed distant apart.
- (b) shorter in length and placed close together.
- (c) longer in length and placed close together.
- (d) in any arrangement.

**Answer: (b) shorter in length and placed close together.**

**48. In induction heating**

- (a) heat is produced due to currents induced in the charge by electromagnetic action.
- (b) the resistance of the charge must be low and voltage applied must be high in order to produce sufficient heat.
- (c) magnetic materials can be easily treated in comparison to non-magnetic materials.
- (d) all of the above.

**Answer: (d) all of the above.**

**49. In heating the ferromagnetic materials by induction heating, heat is produced owing to**

- (a) flow of induced current through the charge.
- (b) hysteresis loss occurring below Curie temperature.

(c) hysteresis loss as well as eddy current loss occurring in the charge.

(d) any of the above factors.

**Answer: (c) hysteresis loss as well as eddy current loss occurring in the charge.**

### **50. Induction heating takes place in**

(a) insulating materials.

(b) conducting and magnetic materials.

(c) conducting but non-magnetic materials.

(d) conducting materials may be magnetic or non-magnetic.

**Answer: (d) conducting materials may be magnetic or non-magnetic.**

### **51. Induction hardening is possible in case of**

(a) dc supply only.

(b) ac supply only.

(c) ferrous materials only.

(d) non-conducting materials only.

**Answer: (b) ac supply only.**

**52. Low frequency supply is necessary for direct core type induction furnaces because**

- (a) magnetic coupling between the primary and secondary circuit is poor.
- (b) with normal frequency supply the electromagnetic forces cause severe stirring action in the molten metal.
- (c) both (a) and (b).
- (d) none of (a) and (b).

**Answer: (c) both (a) and (b).**

**53. In induction heating, which of the following is of high value?**

- (a) Frequency.
- (b) Current.
- (c) Voltage.
- (d) Power factor.

**Answer: (a) Frequency.**

**54. Induction furnaces are used for**

- (a) heat treatment of castings.
- (d) heating of insulators.
- (c) melting of aluminum.
- (d) all of the above.

**Answer: (a) heat treatment of castings.**

**55. In induction heating, the depth up to which current will penetrate is proportional to**

(a)  $1/(\text{frequency})^{1/2}$ .

(b)  $1/\text{frequency}$ .

(c) frequency.

(d)  $(\text{frequency})^2$ .

**Answer: (a)  $1/(\text{frequency})^{1/2}$ .**

**56. The advantage(s) of eddy current heating is/are**

(a) easy temperature control, little wastage of heat and possibility of heating in vacuum or other special atmosphere.

(b) heat can be made to penetrate into metal surface to any desired depth.

(c) the area of surface over which heat is produced can be accurately controlled.

(d) all of the above.

**Answer: (d) all of the above.**

**57. The supply frequency usually employed for high frequency eddy current heating is**

- (a) 10 MHz
- (b) 10 kHz to 400 kHz
- (c) 5 kHz
- (d) 1 kHz

**Answer: (b) 10 kHz to 400 kHz**

**58. In case of core-loss induction furnace, the charge should be in**

- (a) solid state.
- (b) molten state.
- (c) either of (a) or (b).

**Answer: (c) either of (a) or (b).**

**59. High frequency induction heating is used for**

- (a) ferrous metals only.
- (b) non-ferrous metals only.
- (c) both ferrous and non-ferrous metals.

**Answer: (c) both ferrous and non-ferrous metals.**

**60. In dielectric heating current flows through**

- (a) air.
- (b) dielectric.
- (c) metallic conductor.
- (d) ionic discharge between dielectric medium and metallic conductor.

**Answer: (b) dielectric.**

**61. Dielectric loss is proportional to**

- (a) frequency.
- (b) (frequency)<sup>2</sup>.
- (c) (frequency)<sup>3</sup>.
- (d) (frequency)<sup>1/2</sup>.

**Answer: (a) frequency.**

**62. The dielectric loss in a dielectric is proportional to**

- (a) voltage impressed on the dielectric.
- (b) the square of the voltage impressed on the dielectric.
- (c) the square root of the voltage impressed on the dielectric.
- (d) none of the above.

**Answer: (b) the square of the voltage impressed on the dielectric.**

**63. For heating of plywood, the frequency should be**

- (a) 1 - 2 MHz
- (b) 10 - 25 kHz
- (c) 1 kHz
- (d) 100 Hz

**Answer: (a) 1 - 2 MHz**

**64. The normal voltage used in dielectric heating is**

- (a) 1.5 kV
- (b) 15 kV
- (c) 33 kV
- (d) 66 kV

**Answer: (a) 1.5 kV**

**65. For dielectric heating, with the increase of mass of workpiece, the optimum frequency for maximum power transfer**

- (a) increases.
- (b) decreases.
- (c) independent of mass.

**Answer: (b) decreases.**



**66. For dielectric heating the range of frequency normally employed is**

- (a) 10 kHz to 100 kHz
- (b) 100 kHz to 10 MHz
- (c) 1 MHz to 10 MHz
- (d) 10 MHz to 40 MHz

**Answer: (d) 10 MHz to 40 MHz**

**67. Furnaces used for cremation are**

- (a) electric resistance heating.
- (b) electric arc heating.
- (c) dielectric heating.
- (d) high frequency eddy current heating.

**Answer: (a) electric resistance heating.**

**68. In an electric room heat convector the method of heating used is**

- (a) arc heating.
- (b) resistance heating.
- (c) induction heating.
- (d) infrared heating.

**Answer: (b) resistance heating.**

**69. When the composition of non-ferrous metal is to be varied frequently or when heating is intermittent ..... furnace is desirably used.**

- (a) direct resistance
- (b) direct arc
- (c) indirect resistance
- (d) Ajax Wyatt

**Answer: (c) indirect resistance**

**70. Hysteresis loss and eddy current loss are used in**

- (a) resistance heating.
- (b) dielectric heating.
- (c) induction heating of steel.
- (d) induction heating of brass.

**Answer: (c) induction heating of steel.**

**71. The power factor will be leading in ease of**

- (a) dielectric heating.
- (b) induction heating.
- (c) electric arc heating.

(d) resistance heating.

**Answer: (a) dielectric heating.**

**72. The method of heating used for non-conducting materials is**

(a) induction heating.

(b) dielectric heating.

(c) electric resistance heating.

(d) electric arc heating.

**Answer: (b) dielectric heating.**

**73. The method appropriate for heating of non-ferrous metals is**

(a) indirect resistance heating.

(b) radiant heating.

(c) indirect arc heating.

(d) dielectric heating.

**Answer: (c) indirect arc heating.**

**74. The method suitable for heating of conducting medium is**

(a) induction heating.

(b) indirect arc heating.

(c) eddy current heating.

(d) radiant heating.

**Answer: (a) induction heating.**

**75. The most modern method for food processing is**

(a) induction heating.

(b) resistance heating.

(c) dielectric heating.

(d) eddy current heating.

**Answer: (c) dielectric heating.**

**76. .... is not an application of dielectric heating.**

(a) Food processing.

(b) Soldering.

(c) Gluing of wood.

(d) Diathermy.

**Answer: (b) Soldering.**

**77. The power factor will be maximum in-case of**

(a) electric arc heating.

- (c) induction heating.
- (b) resistance heating.
- (d) dielectric heating.

**Answer: (b) resistance heating.**

**78. The main advantage of dielectric heating is that**

- (a) it can be used for drying the explosives.
- (b) heating occurs in the material itself.
- (c) heating occurs due to the high frequency.
- (d) none of the above.

**Answer: (b) heating occurs in the material itself.**

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