Thermal Properties of Matter

Question 1.
Two stars A and B radiate maximum energy at 3600°A and 3600°A respectively. Then the ratio of absolute temperatures of A and B is
(a) 256 : 81
(b) 81 : 256
(c) 3 : 4
(d) 4 : 3

▼ Answer

Answer: (d) 4 : 3

Question 2.
Which of the following will radiate heat to large extent?
(a) Rough surface
(b) Polished surface
(c) Black rough surface
(d) Black polished surface

▼ Answer

Answer: (c) Black rough surface

Question 3.
Two spheres made of same material have radii in the ratio 2 : 1. if both the spheres are at same temperature, then what is the ratio of heat radiation energy emitted per second by them?
(a) 1 : 4
(b) 4 : 1
(c) 3 : 4
(d) 4 : 3

▼ Answer

Answer: (b) 4 : 1

Question 4.
The earth intercepts approximately one billionth of the power radiated by the sun. if the surface temperature of the sun were to drop by a factor of 2, the average radiant energy incident on earth per second would reduce by factor of
(a) 2
(b) 4
(c) 8
(d) 16

▼ Answer

Answer: (d) 16

Question 5.
A bucket full of hot water is kept in a room and it cools from 75°C to 70°C in t1 minutes from 70°C to 65°C in t2 minutes and from 65°C to 60°C in t3 minutes; then
(a) $t1 - t2 = t3$
(b) $t1 < t2 < t3$

(c) t1 > t2 > t3
(d) t1 < t2 > t3

▼ Answer

Answer: (b) t1 < t2 < t3

Question 6.
A sphere, a cube and a thin circular plate, all made of the same material and having the same mass are initially heated to a temperature of 3000°K, which of these will cool fastest?
(a) Sphere
(b) Cube
(c) Plate
(d) None

▼ Answer

Answer: (c) Plate

Question 7.
A perfectly black body emits radiation at temperature T^1 K. if it sis to radiate 16 times this power, its temperature T^2. will be
(a) $T^2 = 16\ T^1$
(b) $T^2 = 8\ T^1$
(c) $T^1 = 4\ T^1$
(d) $T^2 = 2\ T^1$

▼ Answer

Answer: (d) $T^2 = 2\ T^1$

Question 8.
Unit of Stefans constant is given by
(a) W/ m K^2
(b) W/ m^2 K^2
(c) W^2/ m^2 K^4
(d) W/ mK

▼ Answer

Answer: (b) W/ m^2 K^2

Question 9.
The good absorber of heat are
(a) Non-emitter
(b) Poor-emitter
(c) Good-emitter
(d) Highly polished

▼ Answer

Answer: (c) Good-emitter

Question 10.
A black body is at a temperature of 500K. it emits energy at a rate which is proportional to

(a) 500
(b) (500)2
(c) (500)3
(d) (500)4

▼ Answer

Answer: (d) (500)4

Question 11.
The coefficient of transmission of a perfectly black body is
(a) Zero
(b) One
(c) 0.5
(d) 0.75

▼ Answer

Answer: (a) Zero

Question 12.
Newtons law of cooling is also applicable to
(a) Convection losses
(b) Natural convection losses
(c) Forced convection losses
(d) None of the above

▼ Answer

Answer: (c) Forced convection losses

Question 13.
A sphere, a cube and a thin circular plate all made of the same material and having the same mass are initially heated to a temperature of 300°C. which one of these cools faster?
(a) Circular plate
(b) Sphere
(c) Cube
(d) All will cool at the same rate

▼ Answer

Answer: (a) Circular plate

Question 14.
A sphere, a cube and a thin circular plate, all made of the same material and having the same mass are initially heated to a temperature of 3000°K, which of these will cool fastest?
(a) Sphere
(b) Cube
(c) Plate
(d) None

▼ Answer

Answer: (c) Plate

Question 15.
Which of the following statement is wrong?

(a) Rough surfaces are better radiators tan smooth surfaces
(b) Highly polished mirror surfaces are very good radiators
(c) Black surfaces are better absorbers then white ones
(d) Black surfaces are better radiators then white ones

▼ Answer

Answer: (b) Highly polished mirror surfaces are very good radiators

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Question 16.
In which process the rate of transfer of heat is maximum?
(a) Conduction
(b) Convection
(c) Radiation
(d) In all these heat is transferred with the same velocity

▼ Answer

Answer: (c) Radiation

Question 17.
Which of the following will radiate heat to large extent?
(a) Rough surface
(b) Polished surface
(c) Black rough surface
(d) Black polished surface

▼ Answer

Answer: (c) Black rough surface

Question 18.
A body cools from 60°C to 50°C in 10 minutes. If the room temperature is 25°C and assuming Newtonos law of cooling to hold good, the temperature of the body at the end of the next 10 minutes will be
(a) 38.5°C
(b) 40°C
(c) 42.85°C
(d) 45°C

▼ Answer

Answer: (c) 42.85°C

Question 19.
A surface at temperature T0°K receives power P by radiation from a small sphere at temperature T >> T0 and at a distance d. if both T and d are doubled, the power received by surface will becomes approximately
(a) P
(b) 2p
(c) 4p
(d) 16p

▼ Answer

Answer: (c) 4p

Question 20.
The process of heat transfer in which heat is transferred with actual migration of medium particles is known as (AFMC-94)
(a) Conduction
(b) Convection
(c) Radiation
(d) Reflection

▼ Answer

Answer: (b) Convection
