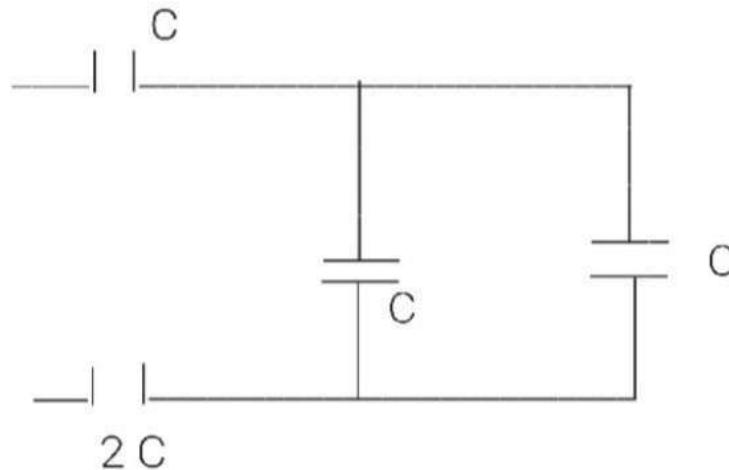




1 Mcq:

【1】 Determine the equivalent capacitance of the combination shown when $C = 12\text{pF}$.



A. 48pF

B. 12pF

C. 24pF

D. 6pF

Answer: **B**

【2】 Before ice can form on a lake, all the water in the lake must be cooled to

A. 4°C

B. a value slightly below the 0°C

C. 0°C

D. Neither of these

Answer: **B**

【3】 The heat from the sun is an example of heat by

A. Heat conduction

B. Convection

C. Radiation

D. Neither of these

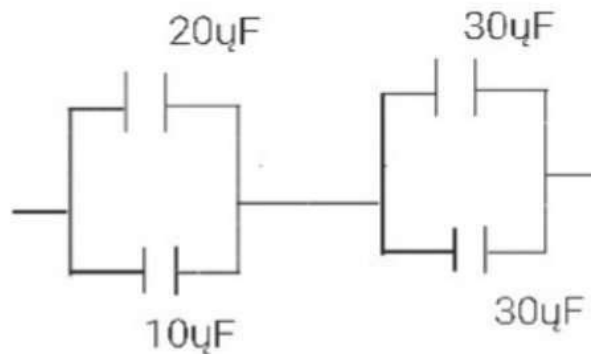
Answer: **C**

【4】 Light is refracted through a diamond. If the angle of incidence is 30° , and the angle of refraction is 12° , What is the index of refraction ?

- A. 1,3 B. 2,4 C. 2,6 D. 1,8

💡 Answer: **B**

【5】 What is the equivalent capacitance of the combination shown ?



- A. $20\mu\text{F}$ B. $90\mu\text{F}$ C. $22\mu\text{F}$ D. $4,6\mu\text{F}$

💡 Answer: **A**

【6】 Calculate the volume of a room with dimensions $10\text{m} \times 7\text{m} \times 3\text{m}$ in units of cubic feet if $1\text{ m} = 3,281\text{ft}$?

- A. 210 m^3
B. $575,9\text{ ft}^3$
C. $8158,9\text{ ft}^3$
D. $7417,2\text{ ft}^3$

💡 Answer: **C**

【7】 If a Celsius thermometer reads 57 degrees Celsius , What will a Fahrenheit thermometer read in the same room ?

- | | |
|------------|----------|
| A. 330 K | B. 57°C |
| C. 134,6 f | D. 195 f |

 **Answer: C**

【8】 A rod made of silver is exactly 100 cm long at a temperature of 20°C . Calculate its length when the temperature is 320°C , given that the coefficient of longitudinal expansion of silver is $\text{Alpha} = 18 \times 10^{-6} \text{C}^{-1}$?

- | | |
|--------------|--------------|
| A. 100,54 cm | B. 100,36 cm |
| C. 99,64 cm | D. 100,46 cm |

 **Answer: A**

【9】 How much heat in calories is released when 40 gm of water is cooled from a temperature of 90°C to 30°C ?

The specific heat of water is 1 cal/g°C .

- | | |
|-------------|-------------|
| A. 3600 cal | B. 1200 cal |
| C. 1800 cal | D. 2400 cal |

 **Answer: D**

【10】 If two mirrors are at an angle of 120° to each other , and a light ray strikes the first mirror at an angle of 65° , what is the angle of incidence on the second mirror ?

- | | | | |
|--------|--------|--------|---------|
| A. 25° | B. 55° | C. 65° | D. 120° |
|--------|--------|--------|---------|

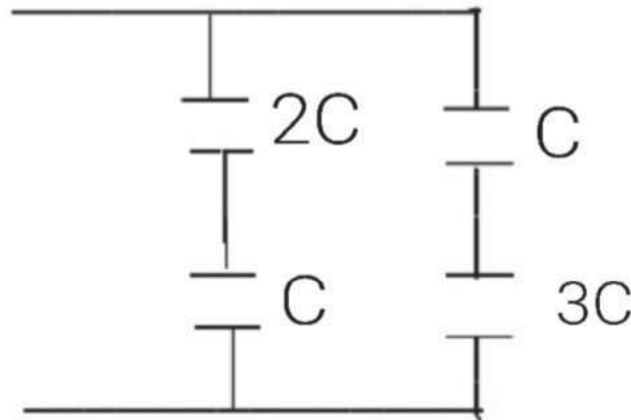
 **Answer: B**

【11】 Light strikes a diamond ($n = 2,42$) at an angle of 60° relative to the normal to the surface. What is the angle of refraction ?

- A. 21° B. 30° C. 38° D. 69°

💡 Answer: **A**

【12】 Determine the equivalent capacitance of the combination shown when $C = 12 \text{ nF}$



- A. 34 nF B. 17 nF C. 51 nF D. 68 nF

💡 Answer: **B**

【13】 A fish 🐟 120 cm below the surface of a pond . What is the apparent depth (in cm) when viewed from a position almost directly above the 🐟 ? (for water , $n = 1,33$)

- A. 50 B. 90 C. 60 D. 40

💡 Answer: **B**

【14】 Calculate the speed of a car traveling at 90 miles per hour in SI units. Knowing that 1 miles = 1609 m , 1 hour = 3600 s ?

A. 24,582 m/s

B. 0,005 m/s

C. 40,225 m/s

D. 201,367 m/s

 Answer: **C**

【15】 Which of the following physical quantities does not have a shear modulus in Liquids ?

A. Pressure

B. Shear modulus

C. Volume

D. Force

 Answer: **B**

【16】 What are the dimensions of the physical quantity “density “ ?

A. L^2

B. ML^{-3}

C. LT^{-1}

D. MLT^{-2}

 Answer: **B**

【17】 What type of image is produced by a concave lens ?

A. always virtual and enlarged

B. always virtual and reduced in size

C. always real and enlarged

D. always real and reduced in size

 Answer: **B**

【18】 A Cat is putting at 50 cm in front of a mirror. The distance between the cat and its image

A. 100 cm B. 150 cm C. 200 cm D. None of them

 Answer: A

【19】 As light travels from one medium to another , it's..... does not change.

A. Velocity
B. Wavelength
C. Frequency
D. Intensity

 Answer: C

【20】 A metal slide is 0,4 cm thick and has a surface area of 50cm² . If the temperature difference between the two opposite surfaces is 120°C . Find the amount of heat that will transferred through the slide in a time of one minute, given that

$$K = 0,2 \text{ cal/sec.cm,}^{\circ}\text{C}$$

A. 360000 cal B. 72000 cal
C. 180000 cal D. None of these

 Answer: C

【21】 The index of refraction for a material generally
with increasing wavelength.

A. Decreases
B. Increases
C. Not change
D. None of them

 Answer: A

【22】 When you stand in front of a convex lens , at a distance less than one focal length the image you see is

- A. real , magnified and inverted
- B. Virtual , small and erect
- C. Virtual , magnified and inverted
- D. Virtual , magnified and erect

 **Answer: D**

【23】 If the dimension the force is MLT^{-2} , and the general law of gravitation is given by the relation $F = G \frac{m^1 m^2}{r^2}$. Then the universal gravitational constant G is given by

- | | |
|------------------------|------------------------|
| A. $M^{-2} L^3 T^{-2}$ | B. $ML^2 T^{-2}$ |
| C. $M^{-1} L^2 T^{-2}$ | D. $M^{-1} L^3 T^{-2}$ |

 **Answer: D**

【24】 A point charge of 4 μC is placed in a vacuum , calculate the magnitude of the electric field at a distance of 0,5 meters from it ?

- | | |
|---------------|---------------|
| A. 143792 N/C | B. 147392 N/C |
| C. 149372 N/C | D. 142943 N/C |

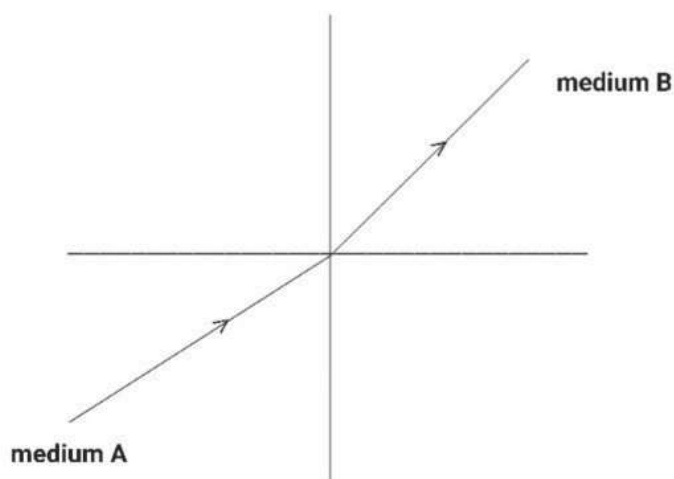
 **Answer: A**

【25】 What is the unit of electric potential ?

- | | | | |
|--------|--------|--------|--------|
| A. J/C | B. N/C | C. C/J | D. V/m |
|--------|--------|--------|--------|

 **Answer: A**

【26】 A light ray enters from medium A to medium B as shown in this figure , the refractive index of medium B relative to A will be



- A. Greater than unity
- C. Equal to unity

- B. Less than unity
- D. Zero

💡 Answer: **B**

【27】 The refractive index of water is 1.33 . The speed of light in water will be

- A. 1.33×10^8 m/s
- C. 2.26×10^8 m/s

- B. 3×10^8 m/s
- D. 2.66×10^8

💡 Answer: **C**

【28】 There are two types of electric charge

- A. Positive and negative
- C. North and South

- B. Protons and electrons
- D. Kinetic and potential

💡 Answer: **A**

【29】 A light ray of wavelength 589 nm traveling through air is incident on a smooth , flat slab of crown glass (with a refractive index 1,37) at an angle of 54° to the normal , What is the angle of refraction ?

- A. $19,2^\circ$ B. $30,19^\circ$ C. $36,19^\circ$ D. $17,2^\circ$

 Answer: **C**

【30】 Coulomb's force between two - point charges $10\mu\text{C}$ and $5\mu\text{C}$ placed at a distance of 150 cm is

- A. 0,2 N B. 0,5 N C. 2 N D. 10 N

 Answer: **A**

2 True or False:

【31】 The image of the concave lens is always virtual , erect and magnified. **✗**

【32】 if a is the acceleration and , t is the time the term $\frac{1}{2}at^2$ has the dimension of the velocity. **✗**

【33】 The total radiation rate emitted from the unit area of the black body is proportional to its absolute temperature. **✗**

【34】 A substance that heats up relatively quickly has low specific heat capacity. 

【35】 The unit of resistance in SI unit system is volt/ ampere.



【36】 When heat is transferred from one object to another, The amount of heat lost = the amount of heat gained. 

【37】 A ray incident parallel to the principal axis of the lens is refracted through the focal point. 

【38】 In diffuse reflection , the reflected rays are parallel. 

【39】 The higher charge density on the surface of a conductor, the greater the electric field around it. 

【40】 Alcohol is used as a thermometer in place of mercury for measuring low temperatures. 

【41】 The specific heat of a substance changes as its mass changes. 

【42】 A convex spherical mirror has the silvered surface of the mirror on the outer . 

【43】 Ice has a lower density than water . 

【44】 The potential energy of two point charges is inversely proportional to the distance between them. 

【45】 Angle of refraction: the angle between the refracted ray & the normal . 

【46】 Snell's law of refraction relates angles of incidence and reflection. 

【47】 In an isovolumetric process , no work is done on the system. 

【48】 The first law of thermodynamics states that the change in internal energy depends on the path taken. 

【49】 The work done on a gas in a cyclic process equals the heat transferred into the system. 

【50】 Archimedes's principle applies only to objects fully submerged in a fluid. 

【51】 The pressure in a fluid decreases as the fluid's speed increases according to Bernoulli's principle. 

【52】 The buoyant force on an object submerged in fluid is equal to the weight of the fluid displaced. ✓

【53】 Thermal contact means two object must be physically touching to exchange energy. ✗

【54】 Temperature is a measure of the average kinetic energy of the molecule in a substance. ✓

【55】 The ideal gas law can be expressed as $PV = nRT$, where R is the universal gas constant. ✓

【56】 The dimensional formula for the coefficient of viscosity is $ML^{-1}T^{-2}$. ✗

【57】 Liquids have a shear modulus and young's modulus. ✗

【58】 A convex mirror always produces a virtual , upright, and reduced image. ✓

【59】 The lateral magnification of a flat mirror is always greater than 1 ✗

【60】 The shear modulus is used to describe the elasticity of anaterial under tension or compression. ✗

Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) The fact that a thermometer "takes its own temperature" illustrates 1) _____
 A) the difference between heat and thermal energy.
 B) the fact that molecules are constantly moving.
 C) thermal equilibrium.
 D) energy conservation.

- 2) When you touch a cold piece of ice with your finger, energy flows 2) _____
 A) from the ice to your finger. B) from your finger to the ice. C) actually both ways

- 3) A substance that heats up relatively quickly has a 3) _____
 A) low specific heat capacity. B) high specific heat capacity.

- 4) The moderate temperatures of islands throughout the world has much to do with water's 4) _____
 A) poor conductivity.
 B) high specific heat capacity.
 C) vast supply of thermal energy.
 D) absorption of solar energy.
 E) high evaporation rate.

- 5) Ice has a lower density than water because ice 5) _____
 A) sinks.
 B) molecules are more compact in the solid state.
 C) molecules vibrate at lower rates than water molecules.
 D) density decreases with decreasing temperature.
 E) is made of open-structured, hexagonal crystals.

- 6) Before ice can form on a lake, all the water in the lake must be cooled to 6) _____
 A) 4°C. B) 0°C.
 C) a value slightly below 0°C. D) Neither of these

- 7) Some molecules are able to absorb large amounts of energy in the form of internal vibrations and rotations. 7) _____
 Materials composed of such molecules have
 A) low specific heat capacities. B) high specific heat capacities.

- 8) The fact that desert sand is very hot in the day and very cold at night is evidence that sand has a 8) _____
 A) high specific heat capacity. B) low specific heat capacity.

- 9) Pour a liter of water at 40°C into a liter of water at 20°C and the final temperature of the two becomes 9) _____
 A) more than 30°C. B) less than 30°C. C) at or about 30°C.

- 10) The lowest temperature possible in nature is 10) _____
A) -273°C . B) 0°C . C) 4 K.
- 11) It is possible to wholly convert a given amount of heat energy into mechanical energy. 11) _____
A) True B) False C) Sometimes possible
- 12) It is possible to totally convert a given amount of mechanical energy into heat. 12) _____
A) True B) False
- 13) When 100 J of heat is added to a system that performs 60 J of work, the thermal energy change of the system is 13) _____
A) 40 J.
B) 0 J.
C) 100 J.
D) 60 J.
E) none of these
- 14) When a volume of air expands against the environment and no heat enters or leaves, the air temperature will 14) _____
A) increase. B) decrease. C) remain unchanged.
- 15) Suppose you put a closed, sealed can of air on a hot stove burner. The contained air will undergo an increase in 15) _____
A) pressure.
B) temperature.
C) thermal energy.
D) all of these
E) none of these
- 16) If you run a refrigerator in a closed room with the refrigerator door open, the room temperature will 16) _____
A) increase. B) decrease. C) remain unchanged.
- 17) As a system becomes more disordered, entropy 17) _____
A) increases. B) decreases. C) remains the same.
- 18) As a piece of metal with a hole in it cools, the diameter of the hole 18) _____
A) remains the same. B) increases. C) decreases.
- 19) If glass expanded more than mercury, then the column of mercury in a mercury thermometer would rise when the temperature 19) _____
A) increases. B) decreases. C) neither of these
- 20) Consider a sample of water at 0°C . If the temperature is slightly increased, the volume of water 20) _____
A) remains the same. B) expands. C) contracts.

- 21) During a very cold winter, water pipes sometimes burst. The reason for this is 21) _____
A) the ground contracts when colder, pulling pipes apart.
B) the thawing process releases pressure on the pipes.
C) water expands when freezing.
D) water contracts when freezing.
E) none of these
- 22) Consider a metal ring with a gap cut in it. When the ring is heated, the gap 22) _____
A) becomes narrower. B) retains its size. C) becomes wider.
- 23) The higher the temperature of an object, the 23) _____
A) shorter the wavelengths it radiates. B) longer the wavelengths it radiates.
- 24) Objects that radiate relatively well, 24) _____
A) absorb radiation relatively well. B) reflect radiation relatively well.
C) both of these D) neither of these
- 25) A substance can absorb heat energy by the process of 25) _____
A) conduction. B) radiation. C) convection. D) all of these
- 26) Hot water will cool to room temperature faster in a 26) _____
A) black pot.
B) silver pot.
C) depends more on the size of the pots than their color
- 27) It is commonly thought that a can of beverage will cool faster in the coldest part of a refrigerator. Knowledge of Newton's law of cooling 27) _____
A) shows this common knowledge is false. B) supports this common knowledge.
- 28) A water-filled paper cup held in a flame will not catch fire. This is because 28) _____
A) the inside of the paper is wet.
B) water is an excellent conductor of heat.
C) the paper cup cannot become appreciably hotter than the water it contains.
D) paper is a poor conductor of heat.
- 29) The silver coating on the glass surfaces of a Thermos bottle reduces energy that is transferred by 29) _____
A) conduction.
B) radiation.
C) friction.
D) convection.
E) none of these

- 30) When a volume of air is compressed, its temperature _____
A) increases.
B) decreases.
C) neither increases nor decreases.
- 31) The reason the Sun's radiant energy is of shorter wavelengths than the earth's is because the Sun _____
A) has a higher temperature than the earth.
B) is an energy source while the earth is primarily an energy receiver.
C) has much more thermal energy.
D) all of these
E) none of these
- 32) Suppose you are served coffee at a restaurant before you are ready to drink it. In order for it to be the hottest when you are ready for it, you should add cream _____
A) right away.
B) at any time.
C) when you are ready to drink the coffee.
- 33) The planet Earth loses heat mainly by _____
A) radiation. B) convection. C) conduction. D) all of these
- 34) When heat is added to boiling water, the water temperature _____
A) increases. B) decreases. C) stays the same.
- 35) In the mountains, water boils at _____
A) a lower temperature than at sea level.
B) a higher temperature than at sea level.
C) the same temperature as at sea level.
- 36) Food in a pressure cooker is cooked faster because of the _____
A) increased thermal energy in the water.
B) greater rate of bubble formation in the water.
C) higher temperature.
D) all of these
E) none of these
- 37) When a gas is changed to a liquid phase, the gas _____
A) releases energy.
B) absorbs energy.
C) neither releases nor absorbs energy.
- 38) Increasing the temperature of 50 grams of water by 1°C requires _____
A) 1 calorie. B) 50 calories. C) none of these

39) Ice is put in a cooler in order to cool the contents. To speed up the cooling process, the ice can be

39) _____

A) wrapped in newspaper.

B) crushed.

C) drained of ice water periodically.

D) kept out of contact with the food.

E) kept in circulating air currents provided by a small fire under one end of the cooler.

40) A hot dog pants

40) _____

A) to bring more oxygen into its lungs.

B) for no particular reason—some things just happen.

C) to impress dogs of the opposite sex.

D) to help evaporation occur in its mouth and bronchial tract.

سبحان الله وبحمده
سبحان الله العظيم

- 1) C
- 2) B
- 3) A
- 4) B
- 5) E
- 6) A
- 7) B
- 8) B
- 9) C
- 10) A
- 11) B
- 12) A
- 13) A
- 14) B
- 15) D
- 16) A
- 17) A
- 18) C
- 19) B
- 20) C
- 21) C
- 22) C
- 23) A
- 24) A
- 25) D
- 26) A
- 27) B
- 28) C
- 29) B
- 30) A
- 31) A
- 32) A
- 33) A
- 34) C
- 35) A
- 36) C
- 37) A
- 38) B
- 39) B
- 40) D

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