1 **Which of the following shows the particulate nature of light?**

A) Compton effect
B) Polarization
C) Reflection
D) Interference
E) Diffraction

Doğru Cevap : A

2 The Sun provides its energy through the converting of the mass into energy.

How much energy (in Joule) is released when 1 gram of the Sun's mass is completely converted into energy?

A) $3.0x10^{13}$
B) $3.0x10^{5}$
C) $9.0x10^{16}$
D) $9.0x10^{13}$
E) $3.0x10^{10}$

Doğru Cevap : D

3 For a submarine descending vertically at constant velocity, the three forces acting on it are viscous drag, upthrust and weight. Which of the relationship between their magnitudes is for a submarine descending vertically at constant velocity, the three forces acting on it are viscous drag, upthrust and weight.

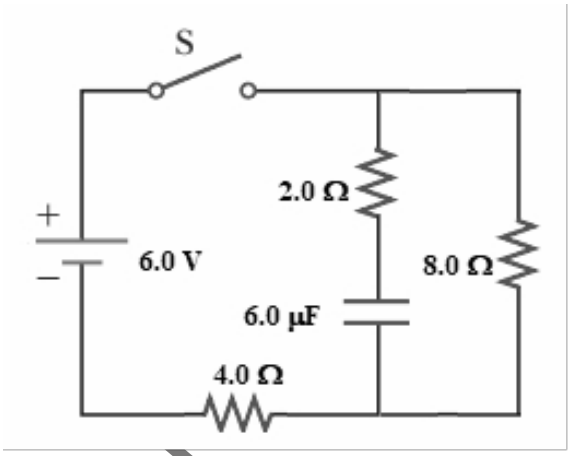
Which of the relationship between their magnitudes is correct?

I- weight < drag
II- weight = drag
III- weight >upthrust

A) Only I
B) Only III
C) II and III
D) I and II
E) I and III

Doğru Cevap : B

4 Consider the following electric circuit. Initially the capacitor is uncharged and the switch is open. The switch is then closed for a long time and the capacitor becomes fully charged.



What is the maximum charge (in μC) on the capacitor?

A) 24
B) 12
C) 48
D) 96
E) 36

Doğru Cevap : A

5 In an alternating current circuit consisting of elements in series, the current increases on increasing the frequency of supply.

Which of the following elements are likely to constitute the circuit?

I- Only resistor
II- Resistor and inductor
III- Resistor and capacitor
IV- Only inductor

A) II and III
B) I and IV
C) Only III
D) II and IV
E) I and II

Doğru Cevap : C

6 Bills are typically charged in units of kW-h. This unit represents .....

Fill in the blanks.

A) electric energy
B) electric potential
C) electric power
D) electric current
E) electric voltage

Doğru Cevap : A

7 **The diagram shows the electric field lines due to two charged parallel metal plates. We conclude that:**

A) an electron at X could have its weight balanced by the electrical force
B) a proton at X experiences a greater force than if it was placed at Z
C) a proton at X would experience the same force if it was placed at Y
D) the upper plate is positive and the lower plate is negative
E) a proton at X experiences less force than if it was placed at Z

Doğru Cevap : C

8 A 50 g cube of ice is added to 500 g of boiling water.

Which of the following is most likely to occur?

A) The more dense ice cube sinks in the less dense hot water
B) The water boils more vigorously because the hot water draws cold from the ice cube
C) The water in the container stops boiling during the phase change of the ice to water
D) The ice cube vaporizes before it strikes the bottom of the container
E) Steam bubbles form on the ice cube

Doğru Cevap : C

9 Meltem wants to drink the hot tea served to her as iced tea. The temperature of the hot tea in the cup is 96 0C and its mass is 100 g.

How much ice in g at 0 0C must be added to this cup so that the temperature of the tea is 30 0C? (Ignore the heat transferred from the tea to the cup and assume that the cup is an ideal calorimeter).

A) 80
B) 70
C) 90
D) 100
E) 60

Doğru Cevap : E

10 In an experiment, a student calculated the speed of sound to be 327.66 ms^{-1} and estimated the accuracy of his result to be ±3%.

Which of the following shows his result with the appropriate number of significant figures?

A) 300 m/s
B) 328 m/s
C) 325 m/s
D) 330 m/s
E) 327.7 m/s

Doğru Cevap : D

11 A coil having area 2 m^2 is placed in a magnetic field which changes from 1 wb /m^2 to 4 wb/m^2 in an interval of 4 second.

What is the emf induced in the coil of single turn?

A) 3 v
B) 0.75 v
C) 4 v
D) 2 v
E) 1.5 v

Doğru Cevap : E

12 **What is the role of a transformer at an electrical power station?**

A) To reduce heating in the transmission lines by stepping up the current
B) To increase heating in the transmission lines by stepping down the voltage
C) To increase heating in the transmission lines by stepping up the voltage
D) To increase heating in the transmission lines by stepping up the current
E) To reduce heating in the transmission lines by stepping up the voltage

Doğru Cevap : E

13 Water is flowing continuously from a tap having an internal diameter of $6x10^{-3}$ m. The water velocity as it leaves the tap is 1 m/s.

The diameter of the water stream at a distance of 40 cm below the tap is close to

A) 9.6×10^{-3} m
B) 7.5×10^{-3} m
C) 2.5×10^{-3} m
D) 3.4×10^{-3} m
E) 5.0×10^{-3} m

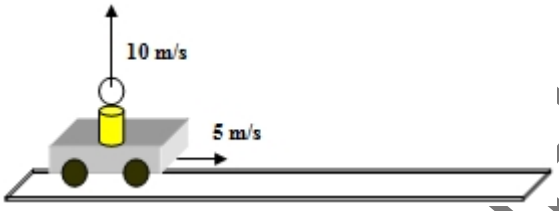
Doğru Cevap : D

14 **The balanced force that act on the moving objects could make the object**

A) Change shape
B) Accelerate
C) Move with constant velocity
D) Change direction
E) Decelerate

Doğru Cevap : C

15



The cart shown above is moving to the right at a constant velocity of 5 m/s when it launches a sphere vertically upward at 10 m/s.

If the cart maintains a constant horizontal velocity, the sphere will most likely land…

Fill in the blanks.

A) behind the cart
B) to the right of the cart
C) to the left of the cart
D) in front of the cart
E) on the cart

Doğru Cevap : E

16 Two boys with masses of 40 kg and 60 kg stand on a horizontal frictionless surface holding the ends of a light 10 m long rod. The boys pull themselves together along the rod.

When they meet, what distance will the 40 kg boy have moved?

A) 6 m
B) 10 m
C) 5 m
D) 4 m
E) need to know the forces they exert

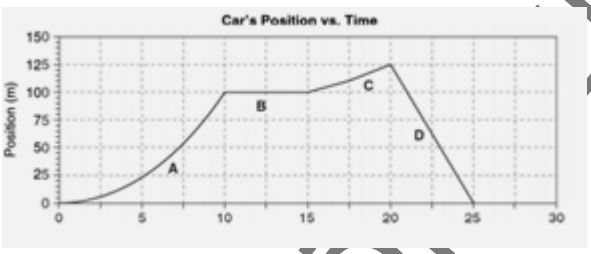
Doğru Cevap : A

17 **Which pair of angles would have the same range if a projectile were fired with the same initial speed?**

A) 80 º and 120 º degrees
B) 15 º and 55 º degrees
C) 40 º and 50 º degrees
D) 85 º and 75 º degrees
E) the angle doesn't matter – it only depends on the velocity

Doğru Cevap : C

18 **By revering to the position versus time graph of the car decide which of the following best ranks the average speed of the car in each region?**



A) D> A> C> B
B) A> C> D> B
C) A> C> B> D
D) D> C> B> A
E) A> B> C> D

Doğru Cevap : A

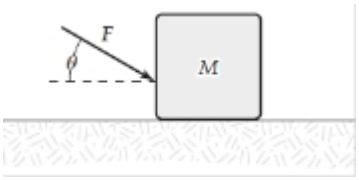
19

If a firefly collides with the windshield of a fast-moving bus, which statement is correct?

A) The bus experiences an impact force with a larger magnitude
B) The firefly experiences an impact force with a larger magnitude
C) The firefly and bus experience forces with same magnitude
D) The firefly and bus experience forces with same direction
E) None of the above

Doğru Cevap : C

20



A block is pushed across a horizontal surface by the force F with constant velocity.
F = 20 N, θ = 30°, and M = 10 kg.

What is the magnitude of the normal force on the block?
(g=9.8 m/s^2)

A) 98N
B) 94N
C) 20N
D) 88N
E) 108N

Doğru Cevap : E

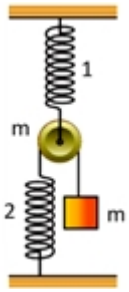
21 A man pushes an 80 N crate a distance of 5.0 m upward along a frictionless slope that makes an angle of 30° with the horizontal. The force he exerts is parallel to the slope.

If the speed of the crate is constant, then the work done by the man is:
(take g = 10 m/s^2)

A) 61 J
B) –200 J
C) 200 J
D) –140 J
E) 260 J

Doğru Cevap : C

22 An object with mass of m is in equilibrium in a system consisting of two identical springs and frictionless pulley with mass of m. The energies stored in springs 1 and 2 are E_1 and E_2 respectively.

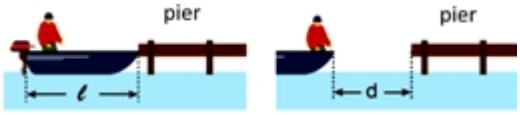


What is the ratio E_1/E_2?

A) 12
B) 3
C) 2
D) 9
E) 6

Doğru Cevap : D

23 When a man walks towards pier with constant velocity inside the boat, he realizes that the boat moves backward by distance d.



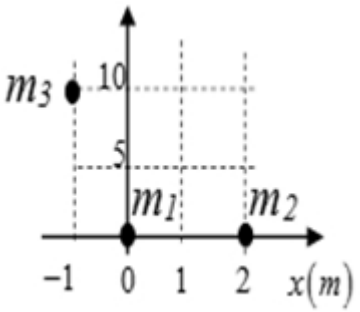
In order to reduce the distance d, which parameter should be greater?

A) Mass and length of boat
B) Mass of man
C) Length of the boat
D) Mass of the boat
E) Mass of man and boat

Doğru Cevap : D

24 Figure shows a three-particle system, with masses m_1=2 kg, m_2=6 kg and m_3=2 kg.

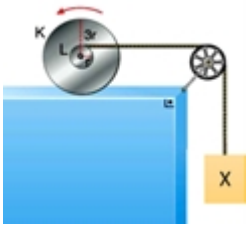
Find the position vector of the center of mass.



A) x = 1 cm and y = 1.8 m
B) x = 1 cm and y = 2.2 m
C) x = 1.2 cm and y = 1.8 m
D) x = 0.8 cm and y = 2 m
E) x = 1 cm and y = 2 m

Doğru Cevap : E

25 Centers of wheels K and L, with radii 3r and r respectively, are fixed.



If the wheel K rotates 1 cycle in direction of arrow, what will be the displacement of object X?

A) $8\pi r$
B) $2\pi r$
C) $6\pi r$
D) $3\pi r$
E) $4\pi r$

Doğru Cevap : A

26 **An airplane flies in a horizontal circle of radius 100 m at a speed of 270 m/s. If the plane were to fly in 800 m circle at a speed of 540 m/s, by what factor would its centripetal acceleration change?**

A) 4.00
B) 2.00
C) 1.00
D) 0.25
E) 0.50

Doğru Cevap : E

27 **Which one of the following is correct when a body moving a circular path with constant speed?**

I- The body has constant velocity
II- The body has variable acceleration
III- The body has variable speed

A) I and III
B) Only III
C) Only II
D) I and II
E) Only I

Doğru Cevap : C

28 If earth rotates faster than its present speed, the weight of an object will ……

Fill in the blanks.

A) Increase at the equator but remain unchanged at the poles
B) Remain unchanged at the equator but decreases at the poles
C) Increase both at the equator and at the poles
D) Decrease at the equator but remain unchanged at the poles
E) Remain unchanged at the equator but increases at the poles

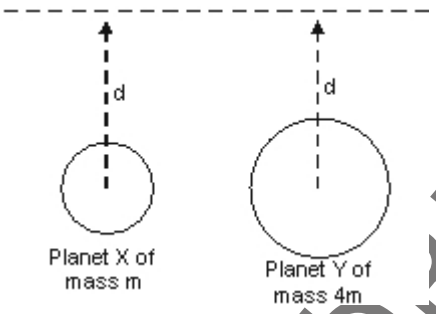
Doğru Cevap : D

29 **Two identical solid copper spheres of radius R are placed in contact with each other. The gravitational force between them is proportional to**

A) R^{-2}
B) R^{2}
C) R^{-4}
D) R^{4}
E) R^{3}

Doğru Cevap : A

30 The diagram shows two planets X and Y of mass m and 4m respectively.



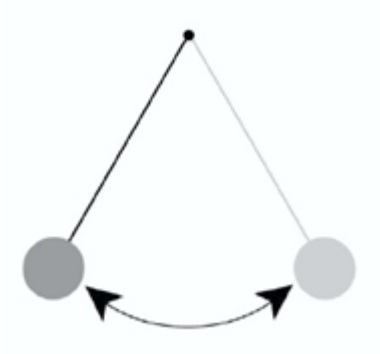
At the distance d from the centre of planet Y the acceleration due to gravity is 4.0 ms^{-2}.

What is the acceleration due to gravity at a distance d from the centre of planet X?

A) 2.8 ms^{-2}
B) 1.0 ms^{-2}
C) 2.0 ms^{-2}
D) 16.0 ms^{-2}
E) 4.0 ms^{-2}

Doğru Cevap : B

31 A pendulum is used on Earth and then transported to the moon where it is released and allowed to swing freely.



Which of the following statements about the pendulum is correct?

A) The kinetic energy of the pendulum on the moon is greater than it was on Earth
B) The period, the frequency, the kinetic energy, and the potential energy of the pendulum on the moon are the same as they were on Earth
C) The frequency of the pendulum on the moon is greater than it was on Earth
D) The potential energy of the pendulum on the moon is greater than it was on Earth
E) The period of the pendulum on the moon is greater than it was on Earth

Doğru Cevap : E

32 **If a body in uniform circular motion covers the given angle in 0.5s, what is the time period of projection, on the x-axis, undergoing SHM? Assume it moves anti-clockwise.**

A) 4s
B) 2s
C) 8s
D) 1s
E) 3s

Doğru Cevap : A

33 **If a spaceship passed you traveling at 0.5 *c*, you might observe all of the following except:**

I. Time on this ship would appear to pass more slowly.
II. Ship would appear shorter than its normal length.
III. The weight of the ship would be more than its normal weight.
IV. The lights on the ship would appear dimmer than normal.

A) I, II and III
B) Only III and IV
C) Only IV
D) Only II
E) Only I

Doğru Cevap : B

34 The up quark (u) has charge + ⅔ *e* and the down quark (d) a charge of – ⅓ *e*.

What is the correct combination of quarks that make up the proton and the neutron?

A) proton: ddd / neutron: uud
B) proton: udd / neutron: uud
C) proton: ddd / neutron: udd
D) proton: uud / neutron: udd
E) proton: uud / neutron: ddd

Doğru Cevap : B

35 Compton scattering can be viewed as a collision between a photon and a free electron at rest.

Which of the following statements is correct, if a photon of wavelength λ and frequency v is used in this process?

A) The photon loses energy so that the scattered photon has a frequency less than v.
B) Momentum is not conserved, but energy is.
C) The electron gains energy from the photon so that the scattered photon's wavelength is less than λ.
D) The electron gives energy to the scattered photon so that the photon's frequency is greater than v.
E) The relation between the incident and the scattered photon is independent of the scattering angle.

Doğru Cevap : A

36 **A p-type semiconductor conducts electricity with .....**

A) neutron
B) protons
C) electron
D) ions
E) holes

Doğru Cevap : E

37 Students are conducting a photoelectric effect experiment. They shine light of known frequency onto a metal and measure the maximum kinetic energy of the emitted photoelectrons. The students increase the intensity of the incident light.

The effect of this increase would most likely be

A) fewer emitted photoelectrons but of higher maximum kinetic energy
B) more emitted photoelectrons and higher maximum kinetic energy
C) more emitted photoelectrons but of the same maximum kinetic energy
D) lower maximum kinetic energy of the emitted photoelectrons
E) higher maximum kinetic energy of the emitted photoelectrons

Doğru Cevap : C

38 **In a nuclear pile, the control rods are composed of**

A) Uranium
B) Isoptocarpine
C) Boron
D) Einsteinium
E) Phlogiston

Doğru Cevap : C

39 Each of the following particles is projected with the same speed into a uniform magnetic field B such that the particle's initial velocity is perpendicular to B.

Which one would move in a circular path with the largest radius?

A) Proton
B) Electron
C) Beta particle
D) Positron
E) Alpha particle

Doğru Cevap : E

40 **Light can be polarised because it is**

A) an electromagnetic wave and has both transverse and longitudinal components.
B) a transverse wave.
C) a mechanical wave.
D) a circular wave.
E) a longitudinal wave.

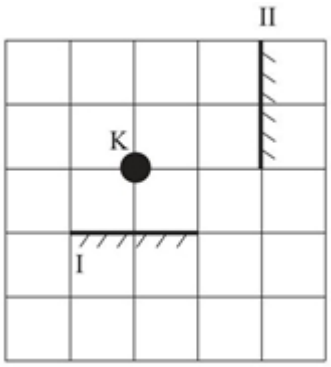
Doğru Cevap : B

41 **To get five images of a single object one should have two plane mirrors at an angle of ……...**

A) 72^0
B) 30^0
C) 36^0
D) 180^0
E) 60^0

Doğru Cevap : E

42



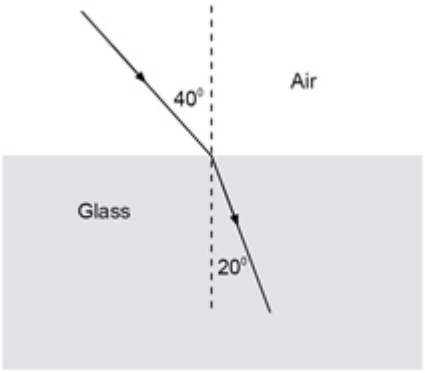
Mirrors are placed on the plane as in the figure.

According to this, how many images are formed of the light object K?

A) 3
B) 4
C) 5
D) 7
E) 6

Doğru Cevap : A

43 A ray of light passes from air into a rectangular glass block.



Which one of the following is true for this light?

I. The absolute refractive index of the glass is (sin 20) / (sin 40)
II. The speed of light in the glass block is (3×10^8 x sin 20) / (sin 40) m/s
III. The frequency of the light decreases when it enters into glass block

A) II and III
B) Only I
C) I and II
D) Only III
E) Only II

Doğru Cevap : E

44 **If monochromatic light passes from water into air with an angle of incidence of 0°, which characteristic of the light will remain the same?**

I. frequency
II. speed
III. wavelength
IV. direction

A) Only I and III
B) Only II and III
C) Only I
D) I, III and IV
E) Only I and IV

Doğru Cevap : E

45 **Which one of the following pairs comprises two SI base units?**

A) coulomb, degree Celsius
B) ampere, degree Celsius
C) coulomb, kelvin
D) coulomb, metre
E) ampere, kelvin

Doğru Cevap : E

46 A cylinder contains 10 kg of gas at pressure of 10^7 N/m^2.

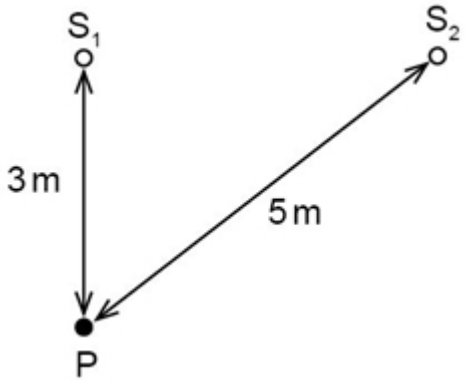
The quantity of gas taken out of the cylinder, if final pressure is 2.0×10^6 N/m^2 , will be _____
(temperature of gas is constant)

A) 2.5 kg
B) 2.0 kg
C) 8.0 kg
D) 7.5 kg
E) 5.0 kg

Doğru Cevap : C

47 Water waves of wavelength 4m are produced by two wave generators, S_1 and S_2, as shown.

Each generator, when operated by itself, produces waves which have an amplitude *A* at **P**, which is 3m from S_1 and 5m from S_2.



When the generators are operated in phase, what is the amplitude of oscillation at P?

A) 0
B) 2 *A*
C) *8 A*
D) *A*
E) ½ *A*

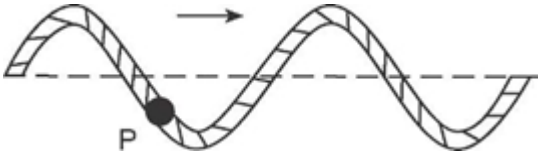
Doğru Cevap : A

48 **Bright bands in interference fringes result from**

A) destructive dispersion
B) destructive interference
C) constructive interference
D) destructive diffraction
E) constructive diffraction

Doğru Cevap : C

49 The diagram below shows a transverse wave moving toward the right along a rope.

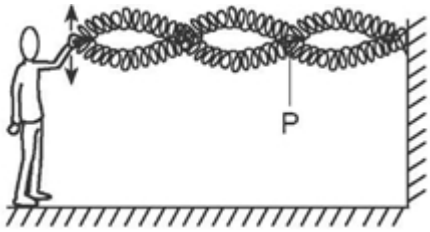


At the instant shown, point Pon the rope ;

A) is moving toward the top of the page
B) is moving toward the bottom of the page
C) is moving toward the right
D) is moving toward the left
E) is stationary

Doğru Cevap : A

50 One end of a long spring is attached to a wall. A student vibrates the other end of the spring vertically, creating a wave that moves to the wall and reflects back toward the student, resulting in a standing wave in the spring, as represented below.



What is the phase difference between the points on both sides of point P?

A) 0°
B) 90°
C) 270°
D) 180°
E) 45°

Doğru Cevap : D

51 Which of the following makes up the structure of genes?

A) Nucleus
B) Glucose
C) Chromosomes
D) DNA
E) RNA

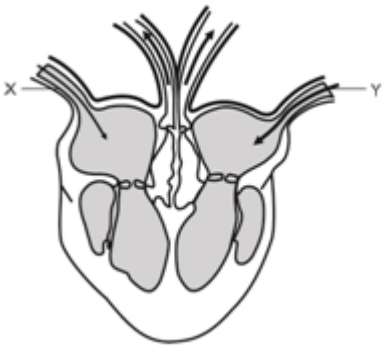
Doğru Cevap : D

52 **Choose the smallest structure of the following parts of a cell.**

A) Cytoplasm
B) Ribosome
C) Nucleus
D) Gene
E) Chromosome

Doğru Cevap : D

53 The diagram below shows structure of human heart.

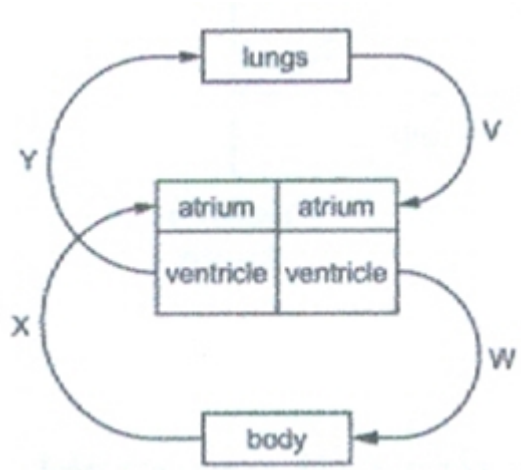


Which of the following statements is <u>not</u> correct about the heart?

A) Right side contains deoxygenated blood
B) Left side contains oxygenated blood
C) Right and left side are seperated
D) X carries blood from lungs to the heart
E) There are four chambers

Doğru Cevap : D

54 The diagram shows the double circulatory system in the lungs and the body.



In which two blood vessels is the pressure the highest?

A) X and V
B) W and Y
C) V and W
D) Y and X
E) X and W

Doğru Cevap : B

55 **Which of the following describes meaning of arrows in a food chain?**

A) Transfer of energy
B) Direction of light
C) Chemical direction
D) Transfer of light
E) Direction of movement

Doğru Cevap : A

56 **Which part of a terrestrial plant does all the following processes?**

I. Photosynthesis
II. Meiosis
III. Mitosis
IV. Protein synthesis
V. Aerobic respiration

A) Root
B) Leaf
C) Seed
D) Flower
E) Stem

Doğru Cevap : D

57 **Which of the following is/are true for yeast cells?**

I. They are unicellular protozoan
II. They carry out aerobic respiration
III. They carry out anaerobic respiration
IV. They store carbohydrates in the form of starch

A) II and IV
B) I and II
C) III and IV
D) II and III
E) I and IV

Doğru Cevap : D

58 Asya had an Asian dish made of beef, mushroom and broccoli.

Identify which letter represents which component of the dish by looking at the table below. (+) shows the presence and (-) shows the absence of the molecules/structures.

Molecules/ Structures	Components of the dish X	Y	Z
Glycogen	+	+	-
Starch	-	-	+
Chitin cell wall	+	-	-
Cellulose cell wall	-	-	+

A) X: Broccoli
Y: Mushroom
Z: Beef

B) X: Beef
Y: Broccoli
Z: Mushroom

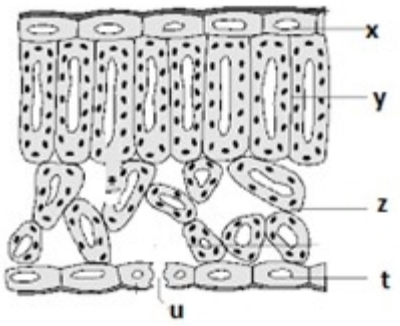
C) X: Mushroom
Y: Beef
Z: Broccoli

D) X: Beef
Y: Mushroom
Z: Broccoli

E) X: Mushroom
Y: Broccoli
Z: Beef

Doğru Cevap : C

59



The diagram above shows internal features of leaf.

Which part of the leaf is reponsible for gas exchange between leaf and atmosphere?

A) U
B) T
C) Y
D) Z
E) X

Doğru Cevap : A

60 **Where does cellular respiration in Amoeba take place?**

A) Cytoplasm
B) Vacuole
C) Mitochondria
D) Glucose
E) Ribosome

Doğru Cevap : C

61 The following table shows some statements given by four students about acids, bases and salts.

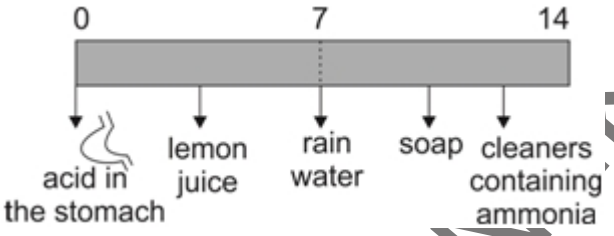
Student 1	Form at the end of neutralisation reaction
Student 2	Contain ionic bonding
Student 3	Solutions conduct electricity
Student 4	corrosive

Which information is/are common for acids, bases and salts?

A) Student 1 and 3
B) Student 1 and 4
C) Student 3 only
D) Student 2 only
E) Student 3 and 4

Doğru Cevap : C

62 The following figure shows some substances and their pH values. One of them is not placed correctly on the pH scale.



Which one is <u>not</u> placed correctly?

A) Rain water
B) Cleaners containing ammonia
C) Lemon juice
D) Acid in the stomach
E) Soap

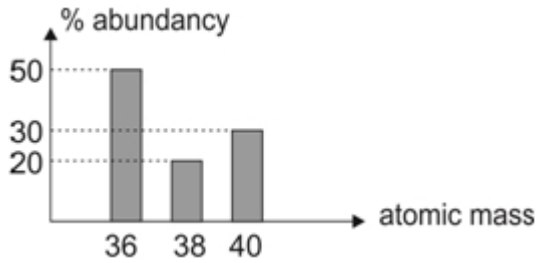
Doğru Cevap : A

63 **Isotopes are atoms of an element that have;**

A) same proton and neutron numbers
B) different electron numbers
C) different mass numbers
D) different proton and neutron numbers
E) same neutron numbers

Doğru Cevap : C

64



The graph above shows the % abundancy of each isotope of the atoms of element A.

The RAM for the element A is;

A) 39
B) 39.4
C) 37.6
D) 38.4
E) 38

Doğru Cevap : C

65 **The correct balanced equation with the simplest coefficients for the following reaction is;**

A) $2Hg + 8HNO_3 \rightarrow 2Hg(NO_3)_2 + 4NO_2 + 2H_2O$
B) $Hg + 4HNO_3 \rightarrow Hg(NO_3)_2 + 2NO_2 + 2H_2O$
C) $2Hg + 4HNO_3 \rightarrow 2Hg(NO_3)_2 + 4NO_2 + 2H_2O$
D) $2Hg + 4HNO_3 \rightarrow 2Hg(NO_3)_2 + 2NO_2 + 4H_2O$
E) $2Hg + 8HNO_3 \rightarrow 2Hg(NO_3)_2 + 4NO_2 + 4H_2O$

Doğru Cevap : B

66 **Why do elements in the same group of the periodic table typically have similar chemical properties?**

A) They have the same number of valence electrons.
B) They have the same number of electron shells.
C) They have the same number of neutrons.
D) They have the same atomic mass.
E) They have the same atomic number.

Doğru Cevap : A

67 I. Na_2O : Sodium oxide
II. $Ba_3(PO_4)_2$: Barium phosphate
III. Al_2O_3 : Dialuminium trioxide
IV. SO_3 : Sulfur trioxide
V. N_2O_5 : Nitrogen tetroxide

Which of the compounds are named correctly?

A) Only II, IV, V
B) Only IV, V
C) Only I, II, IV
D) Only I, III, IV
E) I, II, IV, V

Doğru Cevap : C

68 **Selenium, a component of several enzymes, is in which group of the periodic table?**

A) Alkaline earth metals
B) Noble gases
C) Halogens
D) Chalcogens
E) Alkali metals

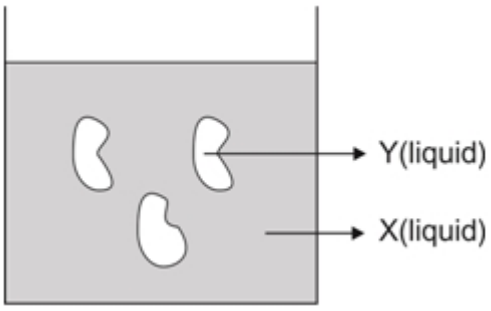
Doğru Cevap : D

69 **Which one of the following contains only one type of atom?**

A) ozone gas
B) table salt
C) steel
D) carbon dioxide (dry ice)
E) pure water

Doğru Cevap : A

70



For the system that is at equilibrium, which one(s) of the following is/are correct?

I. The mixture can be separated by using a separating funnel.
II. The densities of X and Y are equal.
III. The molecular structures of X and Y are similar.

A) Only III
B) II and III
C) I, II and III
D) I and II
E) Only II

Doğru Cevap : E