THE STANDARDIZED ACADEMIC ACHIEVEMENT TEST (SAAT) FOR THE SCIENCE TRACK

TRIAL TEST

Section One

Items: 1 - 22
Time: 25 min

INSTRUCTIONS

- There is only ONE correct answer to each question.
- Be certain to completely shade the circle of the letter of your answer.

Do not turn this page until you are instructed to do so.

Instructions
Read the following questions. Choose the right answer and shade the letter corresponding to each answer on your answer sheet.

1. Which of the following cell structures is responsible for transmitting phenotypes from one generation to another?
A chromosomes
B ribosomes
C cytoskeleton
D centrosomes

2. Which of the following organisms has a thermostable body (endothermic body)?
A lizard (Varanus)
B penguins (Aves)
C frogs and toads (Anura)
D tilapia (fish)

3. Which of the following is not characteristic of viruses?
A Obligate intracellular parasitism is required for replication.
B Host specificity governs which cell can be infected.
C Crystallization outside living cells occurs in some cases.
D artificial media support growth in certain conditions.

4. In which of the following individuals can the thymus gland be seen to be well developed during autopsy?
A 10 year-old male
B 20 year-old male
C 30 year-old male
D 40 year-old male

5. Which of the following is the most complex level of biological organization?
A organism
B population
C community
D ecosystem

6. Which of the following does not secrete digestive enzymes but plays a role in the digestion of lipids?
A pancreas
B salivary gland
C stomach
D gall bladder

7. The electronic orbitals in an atom have:
A equal energies
B similar shapes
C equal distances from the nucleus
D different energies

8. The element that has the electron configuration [Ar] $4s^2$ is classified as a:
A metal
B nonmetal
C metalloid
D noble gas

9. Which of the following reactions will occur?
A $Cl_2 + 2HF \rightarrow 2HCl + F_2$
B $I_2 + 2HCl \rightarrow 2HI + Cl_2$
C $Br_2 + 2HCl \rightarrow 2HBr + Cl_2$
D $Cl_2 + 2HBr \rightarrow 2HCl + Br_2$

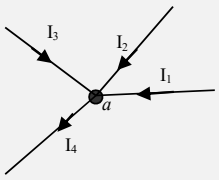
10. Which of the following gases turns limewater milky when bubbled through it?
A CO_2
B H_2
C O_2
D O_3

11. Which of the following elements is the main constituent used in the manufacture of fertilizers?
A sodium
B calcium
C nitrogen
D sulfur

12. If the acceleration of a car is zero, its speed is:
A constant
B decreasing
C increasing
D fluctuating

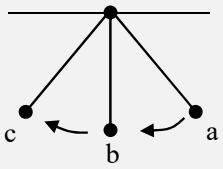
13. The radiation used to check luggage at airports is:
A Alpha
B X-ray
C Beta
D Gamma

14. The figure below shows a junction in an electric circuit with different electric current intensities I_1, I_2, I_3, and I_4. Kirchhoff's junction rule at Junction *a* states that:

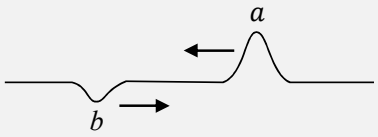


A $I_1 + I_2 - I_3 - I_4 = 0$
B $I_1 + I_2 - I_3 + I_4 = 0$
C $I_1 - I_2 + I_3 + I_4 = 0$
D $I_1 + I_2 + I_3 - I_4 = 0$

15. When the pendulum bob moves from point (b) to point (c), its potential energy is:
A zero
B unchanged
C increasing
D decreasing



16. When waves *a* and *b* in the figure below meet, the resultant interference is:



A partially constructive
B partially destructive
C totally constructive
D totally destructive

17. $\int_{\frac{\pi}{2}}^{0} \sin^3(x)dx + \int_{0}^{-\frac{\pi}{2}} \sin^3(x)dx =$

A $\frac{1}{2}$ B $\frac{1}{4}$
C 0 D $-\frac{1}{4}$

18. For any directed angle *x*, we have $\csc^2(x) - \cot^2(x) =$

A $\cos^2(x) - \sin^2(x)$
B $\cos(x) - \sin(x)$
C $\sin^2(x) + \cos^2(x)$
D $\cos(x) + \sin(x)$

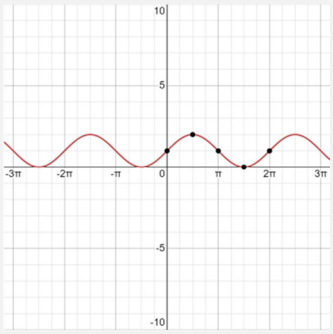
19. A point that satisfies the system of inequalities is:
$y - x \le 2, x + y < 2, y \ge -1$

A $(3,-1)$ B $(0,2)$
C $(-3,-1)$ D $(2,0)$

20. Let $x = \sqrt[5]{8}$, which of the following is true?

A $\log_x \frac{1}{5} = 8$
B $\log_8 x = \frac{1}{5}$
C $\log_x 8 = \frac{1}{5}$
D $\log_8 \frac{1}{5} = x$

21. Which function does the following graph represent?



A $1+\cos(x)$

B $1+\sin(x)$

C $-1+\sin(x)$

D $1-\sin(x)$

22. $\lim_{x \to \pi} \frac{1-\cos(x)}{x} =$

A 0 B 1

C $\frac{\pi}{2}$ D $\frac{2}{\pi}$

Stop!
End of Section.

Section Two

Items: 23 - 44
Time: 25 min

INSTRUCTIONS

- There is only ONE correct answer to each question.
- Be certain to completely shade the circle of the letter of your answer.

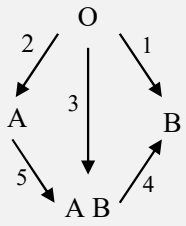
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Instructions
Read the following questions. Choose the right answer and shade the letter corresponding to each answer on your answer sheet.

23 . The main function of the lymph nodes is to:
A protect against infectious diseases
B regulate plasma volume
C regulate blood pressure
D regenerate red blood cells

24 . In the figure below, which arrow indicates an wrong blood transfusion from one blood group to another?

A 1
B 2
C 3
D 4



25 . If we divide a sea star (Asteroidea – Echinoderms) into equal halves and leave them in the sea, each half will:
A continue to divide and then decompose
B develop into a new animal
C continue to live in its new shape
D start repairing the damage using a shell

26 . Fatty acids are absorbed by the intestinal villi into:
A arteries
B veins
C capillaries
D lymph vessels

27 . Which of the following provides sieve tube elements with energy (ATP)?
A companion cells
B fibres
C stalk cells
D vessel elements

28 . When a person suffers from scurvy, it is due to a deficiency of vitamin:
A (A) B (B)
C (C) D (D)

29 . Which of the following statements is true of a reaction at equilibrium?
A The rate of the forward reaction is greater than that of the reverse reaction.
B The rate of the reverse reaction is greater than that of the forward reaction.
C The rates of forward and reverse reactions are equal.
D The rates of forward and reverse reactions are equal to zero.

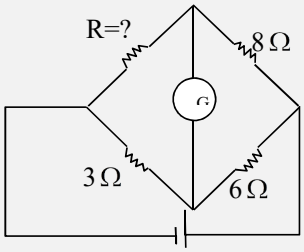
30 . Cellulose is composed of repeating units of:
A Lactose B Sucrose
C Galactose D Glucose

31. Which of the following sublevels is not present in the principal energy level with quantum number (n = 3)?
A s B p
C d D f

32. Elemental sodium reacts with water to give a solution that is:
A Acidic B Basic
C Neutral D Buffer

33. When potassium ($_{19}K$) reacts with fluorine ($_{9}F$), the type of bond formed is:
A polar covalent
B ionic
C covalent
D nonpolar covalent

34. In the figure below, if the circuit is at equilibrium, what is the value of resistance R, in Ω ?

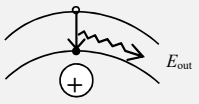


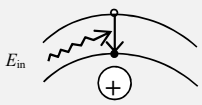
A 2 B 3
C 4 D 16

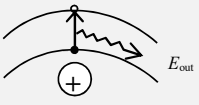
35. For a body under the action of several forces to be in equilibrium, the vector sum of all the forces acting on it must be:
A greater than any force
B less than any force
C equal to zero
D equal to the algebraic sum

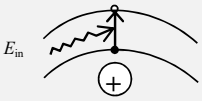
36. According to relativistic mechanics, the largest volume of a moving body observed by an observer is measured when the body is:
A moving horizontally
B moving vertically
C decelerating
D at rest

37. The case that represents an electron transition in an atom from a higher energy level to a lower energy level is:

A 

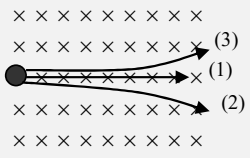
B 

C 

D 

38. A car with a mass of 1000 kg is raised by a hydraulic lift with two pistons whose areas are 0.3 m^2 and 0.6 m^2, respectively. What force, in newtons, must be exerted on the smaller piston to raise the car? (Assume that the free falling acceleration is g =10 m/sec^2).
A 2000 B 5000
C 10000 D 20000

39. The figure below shows three types of ionizing radiation passing through a magnetic field perpendicular to their paths. Accordingly, ray (1) represents:
A γ
B β^+
C β^-
D α



40. The initial offering price of a share in a company is 90 riyals. After three months, the value of the share is 96 riyals. If we assume that the value of the share increases monthly, according to an arithmetic sequence, what is the expected value of the share after seven months?
A 100 B 102
C 104 D 106

41. Let $\underline{A}=\begin{bmatrix} -2 & x \\ 3 & 6 \end{bmatrix}$. The value of x that makes A noninvertible is:
A 3 B 1
C -4 D -9

42. Consider the equation $(x\text{-}1)^2 = -2x$.
The solution set in the real numbers is:
A {-1,1} B {1}
C {0} D $\varnothing$

43. $\sum_{n=1}^{\infty} 8(-\frac{1}{3})^{n-1} =$

A -2 B 6

C 12 D 16

44. The range of the function $f(x) = x^2 + 2x - 3$ is:

A $[-4, \infty)$ B $(-\infty, -4]$

C $[-1, \infty)$ D $(-\infty, -1]$

Stop!
End of Section.

Section Three

Items: 45 - 66
Time: 25 min

INSTRUCTIONS

- There is only ONE correct answer to each question.
- Be certain to completely shade the circle of the letter of your answer.

Do not turn this page until you are instructed to do so.

Instructions
Read the following questions. Choose the right answer and shade the letter corresponding to each answer on your answer sheet.

45 . Algal cells containing spiral-shaped chloroplasts (plastids) are called:

A Volvox B Gelidium
C Spirogyra D Fucus

46 . The desert white truffle is a fungus that lives on the roots of the plant Helianthemus (rockrose). Which of the following describes the nature of their relationship?

A Parasitic
B Symbiotic
C Obligately heterotrophic
D Facultatively heterotrophic

47 . Which of the following enzymes does gastric juice contain?

A amylase B Elastase
C trypsin D pepsin

48 . Which of the following represents the function of insulin?

A conversion of lipids into carbohydrates
B uptake of glucose by tissues
C conversion of glucose into glucagon
D conversion of glycogen into glucose

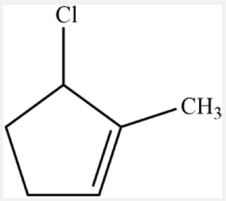
49 . Which of the following features is not considered a characteristic of Phylum Bryophyta (Bryophytes)?

A having semi – roots
B having vascular tissues
C having semi – shoots
D having semi – stems

50 . The role of Heparin in blood plasm is to:

A form a clot during injury
B transport carbon dioxide in the blood
C transfer oxygen in the blood
D prevent blood clotting

51 . According to IUPAC nomenclature, the name of the following compound is:



A 3-chloro 2-methyl cyclobutane
B 2-chloro 3-methyl cyclobutene
C 5-chloro 1-methyl cyclopentene
D 3-chloro 2-methyl cyclopentene

52 . Which of the following compounds has the highest boiling point?

A $CH_3 – O – CH_3$
B CH_3CHO
C CH_3COOH
D $C_2H_5 – NH_2$

53. In a multi-electron atom, which of the following sublevels has the lowest energy?

A 4s B 3d
C 4p D 4f

54. According to the Lewis theory of acids and bases, which of the following is a base?

A H^+ B NH_3
C BF_3 D $AlCl_3$

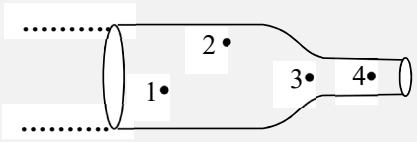
55. The gas produced from the reaction between sodium and water is:

A H_2 B CO_2
C N_2 D O_2

56. What is the type of energy possessed by a body due to its mechanical motion?

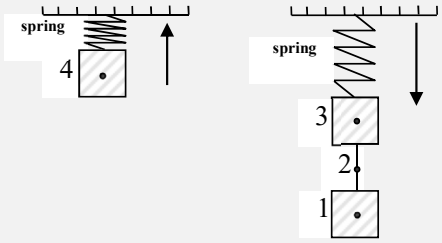
A Kinetic
B Potential
C Photonic
D Electric

57. A liquid flows through the tube shown below. At which point does it have the greatest speed?



A 4 B 3
C 2 D 1

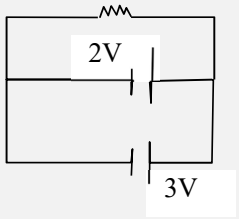
58. In the figure below, at which point does the body have the greatest gravitation potential energy?



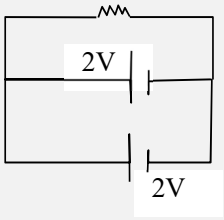
A 4 B 3
C 2 D 1

59. Which of the following circuits shows a meaningful ideal electric circuit?

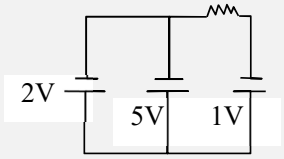
A



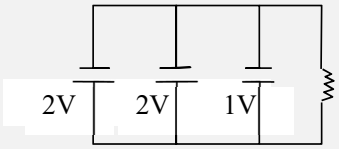
B



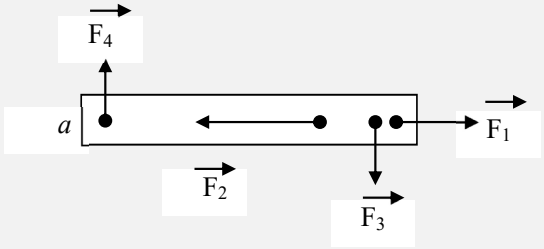
C



D

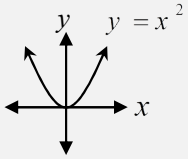


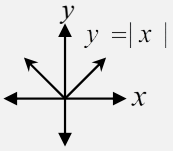
60. In the figure below, the force that creates rotation about point *a* is:

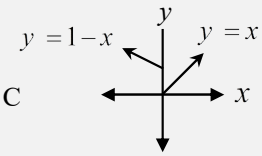


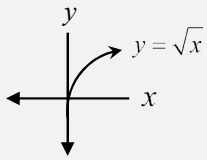
A F_1 B F_2
C F_3 D F_4

61. Which of the following graphs represents a function that is continuous and differentiable at $x = 0$?

A 

B 

C 

D 

62. The solution set of the equation $|x-2| = 2-x$ is:

A $(-\infty, 2]$ B $(-\infty, 4]$

C $[0, 2]$ D $[0, 4]$

63. If $f(x) = 3x^2 - 6x + 2$ is an antiderivative of the function g(x), then $g(x)$ is:

A $6x - 6$ B $x^3 - 3x^2 + 2x$

C $3x - 6$ D $x^3 - 3x^2 + 2x + c$

64. If ${}_{2n}C_7 = {}_{2n}C_5$, find the value of ${}_nC_5$.

A 6 B 15

C 30 D 32

65. The focus of the parabola represented by the equation $(y-3)^2 = -2x$ is:

A (0,3.5) B (0, 2.5)

C $(\frac{1}{2}, 3)$ D $(-\frac{1}{2}, 3)$

66. The value of $\cos 45^\circ \sin 15^\circ + \sin 45^\circ \cos 15$ is:

A $\frac{1}{2}$ B $\frac{\sqrt{2}}{2}$

C 1 D $\frac{\sqrt{3}}{2}$

Stop!
End of Section.

Section Four

Items: 67 - 88
Time: 30 min

INSTRUCTIONS

- There is only ONE correct answer to each question.
- Be certain to completely shade the circle of the letter of your answer.

Do not turn this page until you are instructed to do so.

Instructions
Read the following questions. Choose the right answer and shade the letter corresponding to each answer on your answer sheet.

67 . The movement of a molecule from a medium of lower concentration to a medium of higher concentration is called:
A active transport
B permeability
C osmosis
D diffusion

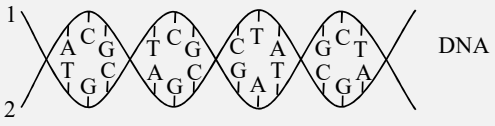
68 . Cell genes are responsible for the synthesis of:
A enzymes
B amino acids
C nucleic acids
D nitrogen bases

69 . When an area of the skin is pressed, it returns to its normal shape because of the presence of:
A loose (soft) connective tissue
B fibrous connective tissue
C vascular connective tissue
D mucoid connective tissue

70 . If a transverse section of a plant stem contains cambium tissue, the plant belongs to:
A Monocotyledon (Monocot)
B Dicotyledon (Dicot)
C Pteridophyte (fern)
D Bryophyte (Bryophyta)

71 . Which of the following animal orders does not have excretory organs?
A Annelida (Annelida)
B Anthropoda (Anthropods)
C Mollusca (Mollsska)
D Echinoderms (Echinodermata)

72. In the figure below, if DNA strand (1) is used to form mRNA strand, what will be the sequence of nitrogenous bases in the newly formed mRNA strand?



A TGC AGE GAT CGA
B UGC UCG GAU GCU
C UCG UGC CTU CGC
D TCG ACG CAT GCA

73 . The smallest particle of an element that retains the characteristic chemical properties of that element is:
A an element B a compound
C an atom D a molecule

74 .Which of the following compounds is nonpolar?
A NH_3 B HF
C CH_4 D H_2O

75 Electronegativity of an atom is defined as its ability to:
A accept an electron pair during chemical reactions
B donate an electron pair during chemical reactions
C attract electrons within a chemical bond toward itself
D form ions by gaining or losing electrons

76. A catalyst increases the rate of a chemical reaction by:
A increasing the enthalpy of the reaction
B decreasing the enthalpy of the reaction
C increasing the activation energy of the reaction
D decreasing the activation energy of the reaction.

77. At 25 ºC, the molar concentration of hydronium ions (H_3O^+) in an acidic solution is:

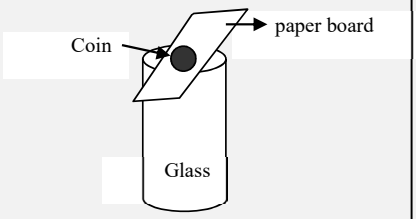
A less than 10^{-7} B more than 10^{-7}
C equal to 10^{-7} D equal to 10^{-14}

78. A man with nearsightedness needs to wear glasses. If his far point is 3/2 *m*, what lens power, in diopters, is required?

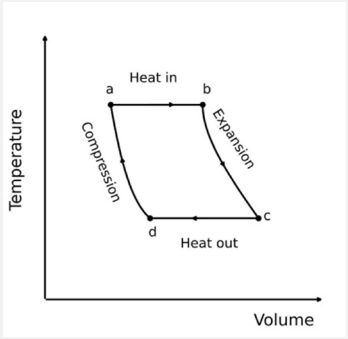
A -2/3 B -3/2
C -2 D -3

79. In the figure below, if the paper board is pulled quickly by a horizontal force, the coin will fall into the glass. This observation is an application of:

A torque
B inertia
C coupling
D impulse



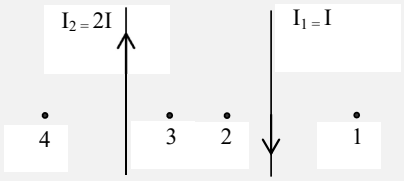
80. In the thermodynamics Carnot cycle shown below, the path from point *c* to point *d* is:



A adiabatic B isothermal
C isobaric D isochoric

81. In the figure below, at which point does the net magnetic field vanish?

A 1
B 2
C 3
D 4



82. If a radioactive element has a mass of 12 *g* and a half – life of 25 days, after how many days will its mass reduce to 1.5 *g* ?

A 50 B 75
C 100 D 125

83. The solution set of the inequality $|3x+4| < -4$ is:

A all real numbers
B $\left\{x \mid x < -\frac{8}{3}\right\}$
C $\varnothing$
D $\{x \mid x > 0\}$

84. If $\underline{A} = \begin{bmatrix} 6 & 4 \\ 6 & 8 \end{bmatrix}$, then $\underline{A}^{-1} =$

A $\begin{bmatrix} \frac{1}{3} & -\frac{1}{6} \\ -\frac{1}{4} & \frac{1}{4} \end{bmatrix}$ B $\begin{bmatrix} \frac{1}{4} & -\frac{1}{6} \\ -\frac{1}{4} & \frac{1}{3} \end{bmatrix}$

C $\begin{bmatrix} \frac{1}{3} & \frac{1}{6} \\ \frac{1}{4} & \frac{1}{4} \end{bmatrix}$ D $\begin{bmatrix} \frac{1}{4} & \frac{1}{6} \\ \frac{1}{4} & \frac{1}{3} \end{bmatrix}$

85. The number of possible arrangements of five different books on a shelf, such that two particular books are always next to each other, is:

A $4!$ B $2\times4!$

C $5!$ D $2\times5!$

86. Let $f(x)=\begin{cases}\frac{x^2-64}{x-8} & |\ x\neq8\\ \text{h} & |\ x=8\end{cases}$

The value of h that makes $f(x)$ continuous at $x=8$ is:

A -16 B -8

C 8 D 16

87. Let $f(x)=x^2-3x+4$

The slope of the tangent to the curve defined by $f(x)$ at the point $(0,4)$ is:

A -3 B $-\frac{1}{3}$

C 1 D 4

88. If $y=3^{2x}$, then $\frac{dy}{dx}=$

A $3^{2x}\times2x\times In(3)$

B $3^{2x}\times2x\times\frac{1}{In(3)}$

C $3^{2x}\times In(9)$

D $3^{2x}\times\frac{1}{In(9)}$

Thank you for following the instructions.
Wishing you a successful future.

Answer Key

Question	Answer	Question	Answer	Question	Answer	Question	Answer
1	A	23	A	45	C	67	A
2	B	24	D	46	B	68	A
3	D	25	B	47	D	69	B
4	A	26	D	48	B	70	B
5	D	27	A	49	B	71	D
6	D	28	C	50	D	72	B
7	D	29	C	51	C	73	C
8	A	30	D	52	C	74	C
9	D	31	D	53	A	75	C
10	A	32	B	54	B	76	D
11	C	33	B	55	A	77	B
12	A	34	C	56	A	78	A
13	B	35	C	57	A	79	B
14	D	36	D	58	A	80	B
15	C	37	A	59	B	81	A
16	B	38	B	60	C	82	B
17	C	39	A	61	A	83	C
18	C	40	C	62	A	84	A
19	C	41	C	63	A	85	B
20	B	42	D	64	A	86	D
21	B	43	B	65	D	87	A
22	D	44	A	66	D	88	C

May Allah grant you success

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