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62. The mucus and cilia of the nasal cavity work together to:
a. Increase the rate of diffusion of oxygen
b. Produce mucus for vocal cord lubrication
c. Filter air and prevent the entry of microorganisms
d. Exchange oxygen and carbon dioxide with blood
63. During gaseous exchange in human body, maximum percentage of CO_2 is transported from body tissues to lungs as:
a. Bicarbonate ion
b. Carbaminohemoglobin
c. Dissolved CO_2 in plasma
d. Gaseous form as bubbles
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a. Pneumonia
b. Chronic bronchitis
c. Emphysema
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b. Insulin synthesis
c. Producing bile
d. Storage of Vitamin A
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b. Aldosterone secretion increases, producing concentrated urine
c. ADH release is inhibited, resulting in a large volume of dilute urine
d. Ultrafiltration stops until water balance is restored

37. A woman has irregular menstruation due to failure of proliferative endometrial thickening. Which hormone is deficient in her body?
☒ a. Estrogen
 b. Oxytocin
 c. Luteinizing
 d. Follicle stimulating
38. A patient having a painless, non-itching ulcerated sore with hard edges on genitals is most likely suffering from:
 a. Gonorrhea
 b. Syphilis
☒ c. Genital Herpes
 d. AIDS
39. The ribs not attached to the sternum are called:
☒ a. True ribs
 b. False ribs
 c. Floating ribs
 d. Vertebro-sternal ribs
40. A tissue is found to have cells embedded in a firm matrix, lacks blood vessels and receives nutrients by diffusion. It also resists compression forces in joints. This tissue is most likely:
 a. Compact bone
 b. Spongy bone
 c. Adipose
☒ d. Cartilage
41. A tissue sample shows striated, multinucleated cells and has voluntary control. Which fundamental role is most associated with this tissue?
 a. Pumping blood
 b. Movement of internal organs
☒ c. Maintenance of posture and locomotion
 d. Production of digestive enzymes
42. The T-tubule and the terminal portion of the adjacent sarcoplasmic reticulum collectively form:
 a. Sarcomere
☒ b. Triad
 c. Sarcoplasm
 d. Sarcolemma
43. During skeletal muscle contraction, the A-band of fiber:
 a. Shortens
 b. Elongates
 c. Disappears
☒ d. Remains constant
44. The joint formed between adjacent vertebrae, allows slight movement and has no synovial cavity is - classified as:
 a. Synovial joint
☒ b. Fibrous joint
 c. Hinge joint
 d. Cartilaginous joint
45. A cricketer rotates his shoulder joint to throw the ball in any direction. What type of joint is this?
 a. Pivot joint
☒ b. Ball and socket joint
 c. Hinge joint
 d. Condylod joint
46. In arthritis, friction and inflammation of joints, primarily affects which body function?
 a. Exchange of gases
 b. Production of RBCs
 c. Deposition of calcium in bones
☒ d. Smooth movement of joints
47. If green is a dominant and yellow is a recessive trait, then what percentage of the F_2 generation will be homozygous recessive?
 a. 0%
 b. 25%
☒ c. 50%
 d. 75%
48. In a monohybrid cross of round (RR) and wrinkled seeded (rr) pea plants, all F_2 offspring are round seeded (Rr). If an F_1 plant is crossed with a homozygous recessive (rr) plant, what will be the phenotypic ratio of round to wrinkled offspring?
 a. 1:3
 b. 1:4
 c. 0:4
☒ d. 1:1
49. Which condition results in a 1: 1: 1: 1 phenotypic ratio in the offspring of a dihybrid test cross?
 a. Complete linkage
☒ b. No linkage
 c. Sex linkage
 d. Mutation
50. An X-linked recessive allele inherited from a carrier mother (father is unaffected) is most likely to be expressed in which child?
 a. Son
 b. Daughter
☒ c. Both equally
 d. None of them
51. Which of the following is a disorder caused by a recessive X-linked trait?
 a. Vitamin D resistant rickets
 b. Anemia
☒ c. Colour blindness
 d. Cystic Fibrosis
52. Identify the X-linked dominant disorder from the following:
 a. Haemophilia
 b. Colour blindness
 c. Baldness
☒ d. Hypophosphatemic rickets
53. The genetic basis of haemophilia is:
 a. A dominant allele on chromosome 21
☒ b. A recessive allele on the X chromosome
 c. A recessive allele on the Y chromosome
 d. A mitochondrial mutation
54. The fluid present in the pericardial cavity functions to:
 a. Nourish the heart muscles
 b. Prevent blood clotting
☒ c. Reduce friction during heart movement
 d. Generate electrical impulse
55. The phase of the cardiac cycle during which blood is pumped to lungs and the entire body is called:

75. Peritubular capillaries are formed from:

- a. Glomerulus
- b. Afferent arteriole
- ☒ c. Efferent arteriole
- d. Interlobular artery

76. Dialysis or kidney transplantation is usually required when kidney function falls below ___ of normal.

- ☒ a. 70%
- b. 50%
- c. 25%
- d. 10%

77. Which nitrogenous waste is the MAIN excretory product in humans, and has relatively low toxicity compared to ammonia?

- ☒ a. Urea
- b. Uric acid
- c. Creatinine
- d. Ammonia

78. DNA probes enable faster identification of disease causing bacteria than conventional methods because of advances in:

- a. Non-biological methods
- ☒ b. Biotechnology
- c. Antibiotics
- d. Surgery

79. The most common vector used to deliver a therapeutic gene into target cells is:

- ☒ a. Plasmid
- b. Liposome
- c. Genetically altered virus
- d. Restriction enzyme

80. Monoclonal antibodies are:

- a. A mixture of different antibodies
- ☒ b. A group of identical antibodies produced by identical immune cells
- c. Antibodies produced only by T-lymphocytes
- d. Radioactively labelled antibodies

81. Which of the following correctly matches the biotechnology product with its application?

- ☒ a. Biochips: Supply biologically fixed nitrogen to crops
- b. Mycorrhiza: Deliver drugs to target cells using nanoparticles
- c. Nanoparticles: Efficient drug delivery at target cells and diagnosis of disease
- ☒ d. Biofertilizers: Detect bioterrorism agents using miniaturized laboratories

PHYSICS

$$A+B=$$

82. When two vectors A and B are added, which statement is correct?

- ☒ a. $A+B$ and $B+A$ have different magnitudes but the same direction
- b. The resultant depends on which vector is drawn first
- c. $A+B=B+A$, so changing the order does not change the resultant
- d. The commutative law applies only when the vectors are perpendicular

83. The direction of linear momentum is the same as the direction of:

- a. Force
- b. Acceleration
- ☒ c. Velocity
- d. Displacement

$$p=mv$$

84. Which situation represents uniform acceleration?

- a. Velocity changes by unequal amounts during equal time intervals
- b. Acceleration changes continuously with time
- ☒ c. Velocity changes by equal amount in equal intervals of time
- d. Velocity remains constant throughout the motion

85. A particle moves from 40m at 10s to 20m at 15s. Its average velocity is:

- ☒ a. 4 m/s
- b. -4 m/s
- c. 0.04 m/s
- d. -0.04 m/s

$$v = \frac{\Delta x}{\Delta t} = \frac{20-40}{15-10} = \frac{-20}{5} = -4 \text{ m/s}$$

86. A 4 kg block and an 8 kg block are pushed with the same force on a frictionless surface. Which statement is CORRECT?

- a. Both blocks have the same acceleration
- ☒ b. The 4 kg block has double the acceleration of the 8 kg block
- c. The 8 kg block has double the acceleration of the 4 kg block
- d. Both blocks move with the same velocity

87. The maximum height reached by a projectile is directly proportional to:

- ☒ a. $\sin^2 \theta$
- b. $\cos^2 \theta$
- c. $\cos \theta$
- d. $\sin \theta$

$$H =$$

$$T = \frac{2v \sin \theta}{g}$$

$$H = \frac{v^2 \sin^2 \theta}{2g}$$

88. In an isolated system, total energy and momentum is ___ in all situations.

- ☒ a. Conserved
- b. Lost
- c. Doubled
- d. Halved

$$R = \frac{v^2 \sin 2\theta}{g}$$

89. A person pushes against a stationary wall with a constant force for 2 mins. The work done on the wall is:

- a. Positive
- b. Negative
- ☒ c. Zero
- d. Equal to the applied force

90. A motor performs 2400 J of work in 2 minutes. The power generated is:

- a. 10 W
- b. 20 W
- ☒ c. 1200 W
- d. 4800 W

$$P = \frac{W}{t} = \frac{2400}{2} = 1200 \text{ W}$$

91. The equation $P.E = mgh$ is NOT applicable when:

- a. The body's height is much lesser than earth's radius
- ☒ b. The body's height is much greater than earth's radius
- c. The mass is zero
- d. Gravity is constant

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92. If the string breaks while a ball is moving in a circle, the ball will:
- Continue moving in a circle
 - Stop immediately
 - Move in a straight line tangent to the circle
 - Fall directly towards the centre
93. One radian is the angle subtended at the centre by an arc whose length is equal to the _____ of the circle.
- Diameter
 - Radius
 - Circumference
 - Chord
94. The SI unit of angular displacement is:
- Degree
 - Revolution
 - Radian
 - Rad/s
95. A raindrop falls through the air and eventually reaches terminal velocity. At this instant, the net force acting on the raindrop is:
- Zero
 - Greater than its weight
 - Equal to the air resistance
 - Equal to the weight
96. As the skydiver slows down after opening the parachute and approaches terminal velocity, the air resistance is:
- Zero
 - Increased
 - Reduced
 - Not changed
97. A hosepipe ejects water with a velocity of 2 m/s from an opening of 0.05 m². To double the velocity, the cross-sectional area should be:
- 0.025 m²
 - 0.0125 m²
 - 0.05 m²
 - 0.10 m²
98. If the radius of an artery is reduced due to arteriosclerosis, the heart must increase blood pressure to:
- Increase the blood flow rate
 - Maintain the same blood flow rate
 - Reduce the blood flow rate
 - Increase the radius of the artery
99. In a progressive wave, a wave crest moves a distance of _____ during one complete period (T).
- Half a wavelength
 - One wavelength
 - Two wavelengths
 - Multiple wavelengths
100. In transverse waves, the particles of the medium vibrate _____ to the direction of wave propagation, whereas in longitudinal waves they vibrate _____.
- Perpendicular; parallel
 - Parallel; perpendicular
 - Parallel; parallel
 - Perpendicular; perpendicular

101. A wave travels through a string with a frequency of 25 Hz and a wavelength of 1.6 m. How far does the wave travel in 8 seconds?
- 160 m
 - 240 m
 - 320 m
 - 400 m

102. The increase in speed of sound in gas for each 1°C rise in temperature is:
- 0.2 m/s
 - 0.6 m/s
 - 1.2 m/s
 - 2.0 m/s

103. According to Laplace, sound waves travel through air so rapidly that:
- Heat is completely lost to the surroundings
 - Heat is completely gained from the surroundings
 - No heat is exchanged with the surroundings
 - Heat is exchanged slowly with the surroundings

104. A gas absorbs 1.5×10^3 J of heat and performs 5.0×10^2 J of work. Its change in internal energy is:
- 1.0×10^3 J
 - -1.0×10^3 J
 - 2.0×10^3 J
 - -2.0×10^3 J

105. One mole of an ideal gas is heated through 20 K at constant pressure, where $R = 8.315 \text{ J mol}^{-1} \text{ K}^{-1}$. If $C_v = 21 \text{ J mol}^{-1} \text{ K}^{-1}$, the heat supplied is:
- 166 J
 - 420 J
 - 586 J
 - 752 J

106. In an adiabatic process if a gas is allowed to expand suddenly, its temperature will:
- Decrease
 - Increase
 - Remain constant
 - Become absolute zero

107. According to Coulomb's law, if the distance between two point charges is doubled while their magnitudes remain unchanged, the electrostatic force between them becomes:
- One-fourth of its original value
 - One-half of its original value
 - Twice its original value
 - Four times its original value

108. A 12 V battery transfers 5000 C of charge through a circuit. The energy delivered is:
- 4.17×10^2 J
 - 4.17×10^3 J
 - 6.0×10^4 J
 - 6.0×10^5 J

109. An infinite plane sheet has a surface charge density: $\sigma = 8.85 \times 10^{-6} \text{ C m}^{-2}$. The electric field on either side of the sheet is:
- $0.25 \times 10^6 \text{ NC}^{-1}$
 - $0.5 \times 10^6 \text{ NC}^{-1}$
 - $1 \times 10^6 \text{ NC}^{-1}$
 - $2 \times 10^6 \text{ NC}^{-1}$

129. At the boiling point, added heat is used to break forces.
☒ a. Intermolecular
 b. Ionic
 c. Magnetic
 d. Nuclear
130. Hydrogen bonding occurs between hydrogen and a highly _____ atom.
☒ a. Electronegative
 b. Electropositive
 c. Nonpolar
 d. Radioactive
131. In a sodium chloride lattice, each ion is surrounded by ions of _____ charge.
 a. Equal
 b. Negative
☒ c. Opposite
 d. Positive
132. Ionic solids conduct electricity in _____ state.
 a. Frozen
☒ b. Molten
 c. Solid
 d. Vapour
133. A unit cell of crystal lattice is characterized by _____ parameters.
 a. 4
 b. 5
☒ c. 6
 d. 7
134. When gaseous ions of opposite charge combine to form an ionic crystal, lattice energy is _____.
☒ a. Absorbed
☒ b. Released
 c. Stored
 d. Vaporized
135. An increase in temperature shifts the equilibrium in favor of the _____ reaction.
☒ a. Endothermic
 b. Exothermic
 c. Irreversible
 d. Static
136. Addition of sodium acetate to aqueous solution of acetic acid suppresses its:
 a. Condensation
 b. Ionization
 c. Evaporation
☒ d. Reduction
137. The Haber process is exothermic; therefore, decreasing the temperature favors:
☒ a. Decomposition of ammonia
☒ b. Formation of ammonia
 c. Formation of nitrogen gas
 d. No change in equilibrium
138. Activation energy is the minimum energy to:
 a. Increase the reaction yield
 b. Break all chemical bonds in the reactants
☒ c. Initiate a chemical reaction
 d. Separate mixture
139. A reaction with a lower activation energy proceeds at a _____ rate.
- ☒ a. Faster
 b. Later
 c. Slower
 d. Unchanged
140. When heat is absorbed by the system from the surroundings, the sign of heat (q) is:
☒ a. Negative
☒ b. Positive
 c. Variable
 d. Zero
141. According to Hess's Law, the overall enthalpy change depends only on the:
 a. Activation energy
 b. Reaction pathway
☒ c. Initial and final states
 d. Reaction mechanism
142. Which change in oxidation number represents reduction?
☒ a. $+1 \rightarrow +3$
 b. $+2 \rightarrow 0$
 c. $0 \rightarrow +2$
☒ d. $-1 \rightarrow +1$
143. According to VSEPR theory, what determines the shape of a molecule?
 a. Electron charge
 b. Electron mass
☒ c. Electron pairs
 d. Electron volume
144. In the excited state, carbon has _____ half-filled orbitals.
☒ a. 1
 b. 2
 c. 3
 d. 4
145. The dipole moment is used to estimate the _____ character of a bond.
 a. Acidic
 b. Basic
☒ c. Ionic
 d. Organic
146. Which Group IV-A tetrachloride DOES NOT react with water at room temperature?
 a. CCl_4
 b. GeCl_4
 c. PbCl_4
☒ d. SiCl_4
147. Copper shows an exceptional electronic configuration because it has a more stable _____ subshell.
 a. Half-filled
☒ b. Filled
 c. Paired
 d. Vacant
148. When chlorine is present in excess during chlorination of methane, the major product is:
☒ a. Carbon tetrachloride
 b. Chloroform
 c. Methyl chloride
 d. Methylene chloride

19. ☒ a. Two Na^+ ions are pumped in and three K^+ ions are pumped out
☐ b. Three Na^+ ions are pumped in and two K^+ ions are pumped out
☒ c. Three Na^+ ions are pumped out and two K^+ ions are pumped in
☐ d. Equal numbers of Na^+ and K^+ ions are exchanged
20. Which of the following structures can be found in a typical neuron?
☐ a. Dendrites, cell body, cilia
☒ b. Dendrites, cell body, axon
☐ c. Dendrites, cell body, ganglion
☐ d. Cauda equina, cell body, myelin sheath
21. The reversal of polarity across two sides of membrane from -70 mV to 50 mV is called
☐ a. Polarization
☐ b. Hyperpolarization
☒ c. Repolarization
☐ d. Depolarization
22. A student quickly pulls his hand away from a hot iron after accidentally touching it. This response is best classified as:
☐ a. Conditioned reflex
☐ b. Cranial reflex
☒ c. Spinal Reflex
☐ d. Voluntary action
23. A patient suffers a brain injury following a head trauma. During recovery, the patient experiences disturbed sleep patterns and is unable to dream normally. Which part of the brain is most likely affected?
☐ a. Cerebellum
☐ b. Medulla oblongata
☒ c. Pons
☐ d. Thalamus
24. Damage to the area containing dopamine-releasing neurons would most likely affect the:
☐ a. Midbrain
☒ b. Cerebellum
☐ c. Pons
☐ d. Medulla
25. The amygdala is a part of the:
☒ a. Cerebellum
☐ b. Limbic system
☐ c. Reticular formation
☐ d. Medulla oblongata
26. Which characteristic distinguishes enzymes during a chemical reaction?
☐ a. They change the final product
☐ b. They slow down metabolic steps
☒ c. They remain chemically unchanged
☐ d. They become part of reaction product
27. According to the lock and key hypothesis, the active site in enzyme action is regarded as _____ structure.
☒ a. Rigid
☐ b. Flexible
☐ c. Dynamic
☐ d. Elastic
28. Enzyme pepsin shows maximum activity at pH:
☒ a. 1.5 - 1.6
☐ b. 4.5 - 4.7
☐ c. 7.8 - 8.7
☐ d. 8.7 - 9.1
29. pH affects the activity of an enzyme by causing the:
☐ a. Ionization of an active site
☐ b. Increase in the activation energy
☐ c. Removal of prosthetic group from enzyme
☒ d. Decreasing the temperature of reaction mixture
30. Which molecule has a similar structure to the normal substrate?
☒ a. Competitive inhibitor
☐ b. Non-competitive inhibitor
☐ c. Heavy metal ion
☐ d. Cyanide
31. Human beings are involved in an intense struggle for existence because resources such as food, water and space:
☒ a. Double every year
☐ b. Cannot increase at the same rate
☐ c. Increase at the same rate
☐ d. Remain constant
32. Lamarck explained the long neck of Giraffe on the basis of:
☐ a. Mutation
☐ b. Natural selection
☒ c. Inheritance of acquired characteristics
☐ d. Genetic drift
33. A population of rabbits shows variation in fur colour. During snowy winters, white rabbits are less visible to predators and survive in greater numbers than brown rabbits. According to Darwin, this is an example of:
☐ a. Overproduction
☒ b. Natural selection
☐ c. Artificial selection
☐ d. Genetic drift
34. According to Lamarck, what would be expected if an organism loses or modifies a body part during its lifetime?
☐ a. It is passed to offspring
☒ b. It has no effect on offspring
☐ c. It causes genetic mutation
☐ d. It occurs through natural selection
35. Post ovulation, the ruptured follicle is transformed into a glandular structure called ____
☐ a. Cervix
☐ b. Fimbriae
☐ c. Endometrium
☒ d. Corpus luteum
36. Both vas deferens of a male are surgically cut (vasectomy done). Which process remains unaffected after the procedure?
☒ a. Testosterone secretion
☐ b. Sperm transport
☐ c. Ejaculation of sperms
☐ d. Fertilization ability



167. Turn left _____ the traffic signal and the cafe will be on your right.
 a. Into
 b. On
 c. At
 d. Between
168. Which one of the following options contains the appropriate use of tense?
 a. The light went out while I am reading.
 b. The light has gone out while I was reading.
 c. The light went out while I was reading.
 d. The light goes out while I am reading.
169. Which one of the following sentences employs CORRECT subject-verb agreement?
 a. The number of students in Class 9 is twenty.
 b. The number of students in Class 9 are twenty.
 c. The numbers of students in Class 9 is twenty.
 d. The numbers of student in Class 9 are twenty.
170. My parents do not allow me to stay out _____.
 a. Latter
 b. Lately
 c. Late
 d. Later
171. Which of the following is the FALSE cause and effect claim?
 a. Smoking causes lung cancer.
 b. Rain causes wet roads.
 c. Wearing red clothes causes intelligence.
 d. Exercise improves health.

REASONING

172. In how many different ways can four persons be seated on four chairs for a photograph?
 a. 8
 b. 12
 c. 16
 d. 24
173. What is the missing term of the sequence?
 1, 3, 6, 10, 15, 21, 28, _____
 a. 30
 b. 32
 c. 34
 d. 36
174. Meetings are at 9am, 11am, and 2pm. Finance meets before HR. IT meets last. HR does not meet at 9am. Which team meets at 11am?
 a. HR
 b. IT
 c. Finance
 d. Cannot be determined

175. Aimen is Amna's daughter and Salman is Amna's Father. Sarah is Salman's daughter. What is Aimen to Salman?
 a. Grandmother
 b. Granddaughter
 c. Daughter
 d. Mother

176. A hospital performs 25 surgeries daily for 6 days a week. How many surgeries are performed weekly?
 a. 120
 b. 145
 c. 150
 d. 175

177. You park your car in a no-parking zone and are approached by a traffic police officer. What is the most appropriate response?
 a. Argue with the officer to resolve the issue
 b. Leave immediately without permission
 c. Cooperate with the officer and comply with traffic regulations
 d. Try to run away from the location

178. Why is it important to monitor the implementation of a decision?
 a. To hinder progress
 b. To improve and adapt
 c. To assign blame for mistakes
 d. To shut down feedback

179. Human rights protection leads to economic growth. In light of the statement, Pakistan improved its labor laws for protection of rights of labors. However, economic growth is still low. Therefore, human rights protection does not support economic growth. What is the weakness in the argument?

- a. Human rights are only one of many factors influencing economic growth.
 b. Labor laws alone guarantee economic growth.
 c. Economic growth depends only on labor rights.
 d. Human rights have no impact on national development.
180. In a shop having 3 fruits, the oranges are cheaper than grapefruit and pricier than grapes, then _____
 a. Grapefruit is more expensive than grapes
 b. Grapes are more expensive than grapefruit
 c. Oranges are cheaper than grapes
 d. Grapefruit and grapes cost the same

Good Luck! The END.

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37. A woman has irregular menstruation due to failure of proliferative endometrial thickening. Which hormone is deficient in her body?
☒ a. Estrogen
 b. Oxytocin
 c. Luteinizing
 d. Follicle stimulating
38. A patient having a painless, non-itching ulcerated sore with hard edges on genitals is most likely suffering from:
 a. Gonorrhea
 b. Syphilis
☒ c. Genital Herpes
 d. AIDS
39. The ribs not attached to the sternum are called:
☒ a. True ribs
 b. False ribs
 c. Floating ribs
 d. Vertebro-sternal ribs
40. A tissue is found to have cells embedded in a firm matrix, lacks blood vessels and receives nutrients by diffusion. It also resists compression forces in joints. This tissue is most likely:
 a. Compact bone
 b. Spongy bone
 c. Adipose
☒ d. Cartilage
41. A tissue sample shows striated, multinucleated cells and has voluntary control. Which fundamental role is most associated with this tissue?
 a. Pumping blood
 b. Movement of internal organs
☒ c. Maintenance of posture and locomotion
 d. Production of digestive enzymes
42. The T-tubule and the terminal portion of the adjacent sarcoplasmic reticulum collectively form:
 a. Sarcomere
☒ b. Triad
 c. Sarcoplasm
 d. Sarcolemma
43. During skeletal muscle contraction, the A-band of fiber:
 a. Shortens
 b. Elongates
 c. Disappears
☒ d. Remains constant
44. The joint formed between adjacent vertebrae, allows slight movement and has no synovial cavity is - classified as:
 a. Synovial joint
☒ b. Fibrous joint
 c. Hinge joint
 d. Cartilaginous joint
45. A cricketer rotates his shoulder joint to throw the ball in any direction. What type of joint is this?
 a. Pivot joint
☒ b. Ball and socket joint
 c. Hinge joint
 d. Condylod joint
46. In arthritis, friction and inflammation of joints, primarily affects which body function?
 a. Exchange of gases
 b. Production of RBCs
 c. Deposition of calcium in bones
☒ d. Smooth movement of joints
47. If green is a dominant and yellow is a recessive trait, then what percentage of the F_2 generation will be homozygous recessive?
 a. 0%
 b. 25%
☒ c. 50%
 d. 75%
48. In a monohybrid cross of round (RR) and wrinkled seeded (rr) pea plants, all F_1 offspring are round seeded (Rr). If an F_1 plant is crossed with a homozygous recessive (rr) plant, what will be the phenotypic ratio of round to wrinkled offspring?
☒ a. 1:3
 b. 1:4
 c. 0:4
 d. 1:1
49. Which condition results in a 1: 1: 1: 1 phenotypic ratio in the offspring of a dihybrid test cross?
☒ a. Complete linkage
 b. No linkage
 c. Sex linkage
 d. Mutation
50. An X-linked recessive allele inherited from a carrier mother (father is unaffected) is most likely to be expressed in which child?
 a. Son
 b. Daughter
☒ c. Both equally
 d. None of them
51. Which of the following is a disorder caused by a recessive X-linked trait?
 a. Vitamin D resistant rickets
 b. Anemia
☒ c. Colour blindness
 d. Cystic Fibrosis
52. Identify the X-linked dominant disorder from the following:
 a. Haemophilia
 b. Colour blindness
 c. Baldness
☒ d. Hypophosphatemic rickets
53. The genetic basis of haemophilia is:
 a. A dominant allele on chromosome 21
☒ b. A recessive allele on the X chromosome
 c. A recessive allele on the Y chromosome
 d. A mitochondrial mutation
54. The fluid present in the pericardial cavity functions to:
 a. Nourish the heart muscles
 b. Prevent blood clotting
☒ c. Reduce friction during heart movement
 d. Generate electrical impulse
55. The phase of the cardiac cycle during which blood is pumped to lungs and the entire body is called:

75. Peritubular capillaries are formed from:
- Glomerulus
 - Afferent arteriole
 - ☒ Efferent arteriole
 - Interlobular artery
76. Dialysis or kidney transplantation is usually required when kidney function falls below of normal.
- ☒ 70%
 - 50%
 - 25%
 - 10%
77. Which nitrogenous waste is the **MAIN** excretory product in humans, and has relatively low toxicity compared to ammonia?
- ☒ Urea
 - Uric acid
 - Creatinine
 - Ammonia
78. DNA probes enable faster identification of disease causing bacteria than conventional methods because of advances in:
- Non-biological methods
 - ☒ Biotechnology
 - Antibiotics
 - Surgery
79. The most common vector used to deliver a therapeutic gene into target cells is:
- ☒ Plasmid
 - Liposome
 - Genetically altered virus
 - Restriction enzyme
80. Monoclonal antibodies are:
- A mixture of different antibodies
 - ☒ A group of identical antibodies produced by identical immune cells
 - Antibodies produced only by T-lymphocytes
 - Radioactively labelled antibodies
81. Which of the following correctly matches the biotechnology product with its application?
- ☒ Biochips: Supply biologically fixed nitrogen to crops
 - Mycorrhiza: Deliver drugs to target cells using nanoparticles
 - Nanoparticles: Efficient drug delivery at target cells and diagnosis of disease
 - ☒ Biofertilizers: Detect bioterrorism agents using miniaturized laboratories

PHYSICS

$A+B =$

82. When two vectors A and B are added, which statement is correct?
- ☒ A + B and B + A have different magnitudes but the same direction
 - The resultant depends on which vector is drawn first
 - $A + B = B + A$, so changing the order does not change the resultant
 - The commutative law applies only when the vectors are perpendicular

83. The direction of linear momentum is the same as the direction of:
- Force
 - Acceleration
 - ☒ Velocity
 - Displacement
84. Which situation represents uniform acceleration?
- Velocity changes by unequal amounts during equal time intervals
 - Acceleration changes continuously with time
 - ☒ Velocity changes by equal amount in equal intervals of time
 - Velocity remains constant throughout the motion
85. A particle moves from 40m at 10s to 20m at 15s. Its average velocity is:
- ☒ 4 m/s
 - 4 m/s
 - 0.04 m/s
 - 0.04 m/s
86. A 4 kg block and an 8 kg block are pushed with the same force on a frictionless surface. Which statement is **CORRECT**?
- Both blocks have the same acceleration
 - ☒ The 4 kg block has double the acceleration of the 8 kg block
 - The 8 kg block has double the acceleration of the 4 kg block
 - Both blocks move with the same velocity
87. The maximum height reached by a projectile is directly proportional to:
- ☒ $\sin^2 \theta$
 - $\cos^2 \theta$
 - $\cos \theta$
 - $\sin \theta$
88. In an isolated system, total energy and momentum is in all situations.
- ☒ Conserved
 - Lost
 - Doubled
 - Halved
89. A person pushes against a stationary wall with a constant force for 2 mins. The work done on the wall is:
- Positive
 - Negative
 - ☒ Zero
 - Equal to the applied force
90. A motor performs 2400 J of work in 2 minutes. The power generated is:
- 10 W
 - 20 W
 - ☒ 1200 W
 - 4800 W
91. The equation $P.E = mgh$ is **NOT** applicable when:
- The body's height is much lesser than earth's radius
 - ☒ The body's height is much greater than earth's radius
 - The mass is zero
 - Gravity is constant

$p = mv$

$v = \frac{40 - 20}{15 - 10} = -4 \text{ m/s}$

$H = \frac{2v_0 \sin \theta}{g}$
 $H = \frac{v_0^2 \sin^2 \theta}{g}$

$R = \frac{v_0^2 \sin 2\theta}{g}$

$P = \frac{W}{t} = \frac{2400}{2} = 1200 \text{ W}$

Fv

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92. If the string breaks while a ball is moving in a circle, the ball will:
- Continue moving in a circle
 - Stop immediately
 - ☒ Move in a straight line tangent to the circle
 - Fall directly towards the centre
93. One radian is the angle subtended at the centre by an arc whose length is equal to the _____ of the circle.
- Diameter
 - ☒ Radius
 - Circumference
 - Chord
94. The SI unit of angular displacement is:
- Degree
 - Revolution
 - ☒ Radian
 - Rad/s
95. A raindrop falls through the air and eventually reaches terminal velocity. At this instant, the net force acting on the raindrop is:
- Zero
 - Greater than its weight
 - Equal to the air resistance
 - ☒ Equal to the weight
96. As the skydiver slows down after opening the parachute and approaches terminal velocity 2, the air resistance is:
- Zero
 - Increased
 - ☒ Reduced
 - Not changed
97. A hosepipe ejects water with a velocity of 2 m/s from an opening of 0.05m^2 . To double the velocity the cross-sectional area should be:
- ☒ 0.025m^2
 - 0.0125m^2
 - 0.05m^2
 - 0.10m^2
98. If the radius of an artery is reduced due to arteriosclerosis, the heart must increase blood pressure to:
- Increase the blood flow rate
 - Maintain the same blood flow rate
 - ☒ Reduce the blood flow rate
 - Increase the radius of the artery
99. In a progressive wave, a wave crest moves a distance of _____ during one complete period (T).
- ☒ Half a wavelength
 - One wavelength
 - Two wavelengths
 - Multiple wavelengths
100. In transverse waves, the particles of the medium vibrate _____ to the direction of wave propagation, whereas in longitudinal waves they vibrate _____.
- Perpendicular; parallel
 - ☒ Parallel; perpendicular
 - Parallel; parallel
 - Perpendicular; perpendicular

101. A wave travels through a string with a frequency of 25 Hz and a wavelength of 1.6 m. How far does the wave travel in 8 seconds?
- 160 m
 - ☒ 240 m
 - 320 m
 - 400 m
- Handwritten notes for 101:
 $f = 25\text{ Hz}$
 $\lambda = 1.6\text{ m}$
 $T = 8$
 $f = \frac{v}{\lambda} \Rightarrow v = f\lambda = 25 \times 1.6 = 40\text{ m/s}$
 $\text{Distance} = v \times t = 40 \times 8 = 320\text{ m}$

102. The increase in speed of sound in gas for each 1°C rise in temperature is:
- 0.2 m/s
 - ☒ 0.6 m/s
 - 1.2 m/s
 - 2.0 m/s
- Handwritten notes for 102:
 $\frac{v}{T} = \text{constant}$
 $\frac{v_1}{T_1} = \frac{v_2}{T_2}$
 $\frac{v}{273} = \frac{v+0.6}{273+1}$
 $v = 0.6\text{ m/s}$

103. According to Laplace, sound waves travel through air so rapidly that:
- Heat is completely lost to the surroundings
 - Heat is completely gained from the surroundings
 - ☒ No heat is exchanged with the surroundings
 - Heat is exchanged slowly with the surroundings
104. A gas absorbs $1.5 \times 10^3\text{ J}$ of heat and performs $5.0 \times 10^2\text{ J}$ of work. Its change in internal energy (ΔU) is:
- ☒ $1.0 \times 10^3\text{ J}$
 - $-1.0 \times 10^3\text{ J}$
 - $2.0 \times 10^3\text{ J}$
 - $-2.0 \times 10^3\text{ J}$
- Handwritten notes for 104:
 $\Delta Q = \Delta U + W$
 $1.5 \times 10^3 = \Delta U + 5.0 \times 10^2$
 $\Delta U = 1.0 \times 10^3\text{ J}$

105. One mole of an ideal gas is heated through 20K at constant pressure, where $R = 8.315\text{ J mol}^{-1}\text{K}^{-1}$. If $C_V = 21\text{ J mol}^{-1}\text{K}^{-1}$, the heat supplied is:
- ☒ 166 J
 - 420 J
 - 586 J
 - 752 J
- Handwritten notes for 105:
 $C_P - C_V = R$
 $C_P = 21 + 8.315 = 29.315\text{ J mol}^{-1}\text{K}^{-1}$
 $Q = n C_P \Delta T = 1 \times 29.315 \times 20 = 586.3\text{ J}$

106. In an adiabatic process if a gas is allowed to expand suddenly, its temperature will:
- Decrease
 - ☒ Increase
 - Remain constant
 - Become absolute zero
107. According to Coulomb's law, if the distance between two point charges is doubled while their magnitudes remain unchanged, the electrostatic force between them becomes:
- ☒ One-fourth of its original value
 - One-half of its original value
 - Twice its original value
 - Four times its original value
- Handwritten notes for 107:
 $F = \frac{k q_1 q_2}{r^2}$
If r is doubled, F becomes $\frac{1}{4}$ of its original value.

108. A 12 V battery transfers 5000 C of charge through a circuit. The energy delivered is?
- ☒ $4.17 \times 10^2\text{ J}$
 - $4.17 \times 10^3\text{ J}$
 - $6.0 \times 10^4\text{ J}$
 - $6.0 \times 10^5\text{ J}$
- Handwritten notes for 108:
 $E = V \times Q$
 $E = 12 \times 5000 = 60000\text{ J} = 6.0 \times 10^4\text{ J}$

109. An infinite plane sheet has a surface charge density: $\sigma = 8.85 \times 10^{-6}\text{ C m}^{-2}$. The electric field on either side of the sheet is:
- ☒ $0.25 \times 10^6\text{ NC}^{-1}$
 - $0.5 \times 10^6\text{ NC}^{-1}$
 - $1 \times 10^6\text{ NC}^{-1}$
 - $2 \times 10^6\text{ NC}^{-1}$
- Handwritten notes for 109:
 $E = \frac{\sigma}{2\epsilon_0}$
 $E = \frac{8.85 \times 10^{-6}}{2 \times 8.85 \times 10^{-12}} = 0.5 \times 10^6\text{ NC}^{-1}$

129. At the boiling point, added heat is used to break _____ forces.
☒ a. Intermolecular
☐ b. Ionic
☐ c. Magnetic
☐ d. Nuclear
130. Hydrogen bonding occurs between hydrogen and a highly _____ atom.
☒ a. Electronegative
☐ b. Electropositive
☐ c. Nonpolar
☐ d. Radioactive
131. In a sodium chloride lattice, each ion is surrounded by ions of _____ charge.
☐ a. Equal
☐ b. Negative
☒ c. Opposite
☐ d. Positive
132. Ionic solids conduct electricity in _____ state.
☐ a. Frozen
☒ b. Molten
☐ c. Solid
☐ d. Vapour
133. A unit cell of crystal lattice is characterized by _____ parameters.
☐ a. 4
☐ b. 5
☒ c. 6
☐ d. 7
134. When gaseous ions of opposite charge combine to form an ionic crystal, lattice energy is _____.
☐ a. Absorbed
☒ b. Released
☐ c. Stored
☐ d. Vaporized
135. An increase in temperature shifts the equilibrium in favor of the _____ reaction.
☒ a. Endothermic
☐ b. Exothermic
☐ c. Irreversible
☐ d. Static
136. Addition of sodium acetate to aqueous solution of acetic acid suppresses its:
☐ a. Condensation
☐ b. Ionization
☐ c. Evaporation
☒ d. Reduction
137. The Haber process is exothermic; therefore, decreasing the temperature favors:
☒ a. Decomposition of ammonia
☐ b. Formation of ammonia
☐ c. Formation of nitrogen gas
☐ d. No change in equilibrium
138. Activation energy is the minimum energy to:
☐ a. Increase the reaction yield
☐ b. Break all chemical bonds in the reactants
☒ c. Initiate a chemical reaction
☐ d. Separate mixture
139. A reaction with a lower activation energy proceeds at a _____ rate.
140. When heat is absorbed by the system from the surroundings, the sign of heat (q) is:
☒ a. Negative
☐ b. Positive
☐ c. Variable
☐ d. Zero
141. According to Hess's Law, the overall enthalpy change depends only on the:
☐ a. Activation energy
☐ b. Reaction pathway
☒ c. Initial and final states
☐ d. Reaction mechanism
142. Which change in oxidation number represents reduction?
☒ a. $+1 \rightarrow +3$
☐ b. $+2 \rightarrow 0$
☐ c. $0 \rightarrow +2$
☒ d. $-1 \rightarrow +1$
143. According to VSEPR theory, what determines the shape of a molecule?
☐ a. Electron charge
☐ b. Electron mass
☒ c. Electron pairs
☐ d. Electron volume
144. In the excited state, carbon has _____ half-filled orbitals.
☐ a. 1
☐ b. 2
☐ c. 3
☐ d. 4
145. The dipole moment is used to estimate the _____ character of a bond.
☐ a. Acidic
☐ b. Basic
☒ c. Ionic
☐ d. Organic
146. Which Group IV-A tetrachloride DOES NOT react with water at room temperature?
☐ a. CCl_4
☐ b. GeCl_4
☐ c. PbCl_4
☒ d. SiCl_4
147. Copper shows an exceptional electronic configuration because it has a more stable _____ subshell.
☐ a. Half-filled
☒ b. Filled
☐ c. Paired
☐ d. Vacant
148. When chlorine is present in excess during chlorination of methane, the major product is:
☒ a. Carbon tetrachloride
☐ b. Chloroform
☐ c. Methyl chloride
☐ d. Methylene chloride

1. Two Na^+ ions are pumped in and three K^+ ions are pumped out
2. Three Na^+ ions are pumped in and two K^+ ions are pumped out
3. Three Na^+ ions are pumped out and two K^+ ions are pumped in
4. Equal numbers of Na^+ and K^+ ions are exchanged
20. Which of the following structures can be found in a typical neuron?
- Dendrites, cell body, cilia
 - Dendrites, cell body, axon
 - Dendrites, cell body, ganglion
 - Cauda equina, cell body, myelin sheath
21. The reversal of polarity across two sides of membrane from -70 mV to 50 mV is called
- Polarization
 - Hyperpolarization
 - Repolarization
 - Depolarization
22. A student quickly pulls his hand away from a hot iron after accidentally touching it. This response is best classified as:
- Conditioned reflex
 - Cranial reflex
 - Spinal Reflex
 - Voluntary action
23. A patient suffers a brain injury following a head trauma. During recovery, the patient experiences disturbed sleep patterns and is unable to dream normally. Which part of the brain is most likely affected?
- Cerebellum
 - Medulla oblongata
 - Pons
 - Thalamus
24. Damage to the area containing dopamine-releasing neurons would most likely affect the:
- Midbrain
 - Cerebellum
 - Pons
 - Medulla
25. The amygdala is a part of the:
- Cerebellum
 - Limbic system
 - Reticular formation
 - Medulla oblongata
26. Which characteristic distinguishes enzymes during a chemical reaction?
- They change the final product
 - They slow down metabolic steps
 - They remain chemically unchanged
 - They become part of reaction product
27. According to the lock and key hypothesis, the active site in enzyme action is regarded as _____ structure.
- Rigid
 - Flexible
 - Dynamic
 - Elastic
28. Enzyme pepsin shows maximum activity at pH:
- 1.5 - 1.6
 - 4.5 - 4.7
 - 7.8 - 8.7
 - 8.7 - 9.1
29. pH affects the activity of an enzyme by causing the:
- Ionization of an active site
 - Increase in the activation energy
 - Removal of prosthetic group from enzyme
 - Decreasing the temperature of reaction mixture
30. Which molecule has a similar structure to the normal substrate?
- Competitive inhibitor
 - Non-competitive inhibitor
 - Heavy metal ion
 - Cyanide
31. Human beings are involved in an intense struggle for existence because resources such as food, water and space:
- Double every year
 - Cannot increase at the same rate
 - Increase at the same rate
 - Remain constant
32. Lamarck explained the long neck of Giraffe on the basis of:
- Mutation
 - Natural selection
 - Inheritance of acquired characteristics
 - Genetic drift
33. A population of rabbits shows variation in fur colour. During snowy winters, white rabbits are less visible to predators and survive in greater numbers than brown rabbits. According to Darwin, this is an example of:
- Overproduction
 - Natural selection
 - Artificial selection
 - Genetic drift
34. According to Lamarck, what would be expected if an organism loses or modifies a body part during its lifetime?
- It is passed to offspring
 - It has no effect on offspring
 - It causes genetic mutation
 - It occurs through natural selection
35. Post ovulation, the ruptured follicle is transformed into a glandular structure called _____
- Cervix
 - Fimbriae
 - Endometrium
 - Corpus luteum
36. Both vas deferens of a male are surgically cut (vasectomy done). Which process remains unaffected after the procedure?
- Testosterone secretion
 - Sperm transport
 - Ejaculation of sperms
 - Fertilization ability



167. Turn left _____ the traffic signal and the cafe will be on your right.

- a. Into
- b. On
- c. At
- d. Between

168. Which one of the following options contains the appropriate use of tense?

- a. The light went out while I am reading.
- b. The light has gone out while I was reading.
- c. The light went out while I was reading.
- d. The light goes out while I am reading.

169. Which one of the following sentences employs CORRECT subject-verb agreement?

- a. The number of students in Class 9 is twenty.
- b. The number of students in Class 9 are twenty.
- c. The numbers of students in Class 9 is twenty.
- d. The numbers of student in Class 9 are twenty.

170. My parents do not allow me to stay out _____.

- a. Latter
- b. Lately
- c. Late
- d. Later

171. Which of the following is the FALSE cause and effect claim?

- a. Smoking causes lung cancer.
- b. Rain causes wet roads.
- c. Wearing red clothes causes intelligence.
- d. Exercise improves health.

REASONING

172. In how many different ways can four persons be seated on four chairs for a photograph?

- a. 8
- b. 12
- c. 16
- d. 24

1 2 3 4
2 3 4 1
3 4 1 2
4 2 1 3

173. What is the missing term of the sequence?

1, 3, 6, 10, 15, 21, 28, _____

- a. 30
- b. 32
- c. 34
- d. 36

6 7 8 28

174. Meetings are at 9am, 11am, and 2pm. Finance meets before HR. IT meets last. HR does not meet at 9am. Which team meets at 11am?

- a. HR
- b. IT
- c. Finance
- d. Cannot be determined

HR → 9X
IT last - 20

175. Aimen is Amna's daughter and Salman is Amna's Father. Sarah is Salman's daughter. What is Aimen to Salman?

- a. Grandmother
- b. Granddaughter
- c. Daughter
- d. Mother

Salman ← Amna's
Sarah

176. A hospital performs 25 surgeries daily for 6 days a week. How many surgeries are performed weekly?

- a. 120
- b. 145
- c. 150
- d. 175

25 → 6
150

177. You park your car in a no-parking zone and are approached by a traffic police officer. What is the most appropriate response?

- a. Argue with the officer to resolve the issue
- b. Leave immediately without permission
- c. Cooperate with the officer and comply with traffic regulations
- d. Try to run away from the location

178. Why is it important to monitor the implementation of a decision?

- a. To hinder progress
- b. To improve and adapt
- c. To assign blame for mistakes
- d. To shut down feedback

179. Human rights protection leads to economic growth. In light of the statement, Pakistan improved its labor laws for protection of rights of labors. However, economic growth is still low. Therefore, human rights protection does not support economic growth. What is the weakness in the argument?

- a. Human rights are only one of many factors influencing economic growth.
- b. Labor laws alone guarantee economic growth.
- c. Economic growth depends only on labor rights.
- d. Human rights have no impact on national development.

180. In a shop having 3 fruits, the oranges are cheaper than grapefruit and pricier than grapes, then _____.

- a. Grapefruit is more expensive than grapes
- b. Grapes are more expensive than grapefruit
- c. Oranges are cheaper than grapes
- d. Grapefruit and grapes cost the same

Good Luck! The END.

GF ← O → G

Total number of MCQs: 180

Time: 3 hours

No Negative Marking

BIOLOGY

1. Which of the following is correctly matched with its morphological type?
 - a. Tobacco mosaic virus – Polyhedral virus
 - ☒ b. Poliovirus – Rod shaped virus
 - c. Bacteriophage – Tadpole virus
 - d. Tobacco mosaic virus – Spherical virus
2. A patient diagnosed with AIDS has an increased susceptibility to infections due to:
 - a. Destruction of red blood cells
 - b. Excess production of antibodies
 - ☒ c. Weakening of the immune system
 - d. Overproduction of digestive enzymes
3. Which of the following is converted into a two-carbon molecule with the release of carbon dioxide?
 - a. Acetyl-CoA
 - b. Lactate
 - ☒ c. Pyruvate
 - d. Glycerol
4. Metabolism of an 18 carbon fatty acid results in _____ number of Acetyl-CoA?
 - a. 3
 - b. 6
 - c. 9
 - d. 18
5. Which of the following are classified as organic molecules in humans?
 - ☒ a. Water, mineral, oxygen, carbon dioxide
 - b. Carbohydrates, proteins, lipids, nucleic acids
 - c. Vitamins, minerals, water, oxygen
 - d. Glucose, sodium chloride, water, calcium
6. The structural similarity between DNA and RNA nucleotides is due to the presence of:
 - a. Thymine
 - ☒ b. Ribose
 - c. Deoxyribose
 - d. Phosphoric acid
7. Which property of water is primarily helpful in providing a cooling effect to plants and animals?
 - a. Heat Capacity
 - ☒ b. Heat of Vaporization
 - c. Solvent Properties
 - d. Force of Cohesion
8. The reduction of water content in protoplasm to about 10% results in:
 - a. Increased metabolic activity
 - b. Faster cell division
 - ☒ c. Loss of survival of protoplasm
 - d. Increased protein synthesis
9. Maltose is classified as:
 - ☒ a. Monosaccharide
 - b. Disaccharide
 - c. Trisaccharide
 - d. Polysaccharide
10. Haemoglobin is an example of which level of protein structure?
 - a. Primary
 - b. Secondary
 - ☒ c. Tertiary
 - d. Quaternary
11. In cell, glycoproteins are found in the:
 - a. Mitochondria
 - b. DNA
 - c. RNA
 - ☒ d. Plasma membrane
12. A DNA molecule has a length of 340 nm. How many base pairs does it contain?
 - ☒ a. 100
 - b. 340
 - c. 500
 - d. 1000
13. Fatty acids and glycerol are related to _____, whereas _____ are related to protein.
 - a. Nucleic acids; amino acids
 - ☒ b. Lipids; amino acids
 - c. Polymers; polypeptides
 - d. Amino acids; polypeptides
14. A student observes a discoid organelle with a double membrane stroma and thylakoids in plant cell. Which organelle is this?
 - a. Golgi apparatus
 - b. Endoplasmic reticulum
 - ☒ c. Chloroplast
 - d. Mitochondria
15. Which of the following is a COMMON FEATURE of Prokaryotic and Eukaryotic cells?
 - a. Mitochondria
 - ☒ b. Ribosomes
 - c. Endoplasmic reticulum
 - d. Golgi complex
16. Which one of the following is a self-replicating organelle?
 - a. Golgi apparatus
 - b. Lysosome
 - c. Peroxisome
 - ☒ d. Mitochondria
17. If a cell's smooth endoplasmic reticulum is destroyed, which processes will be most affected?
 - a. Protein synthesis and protein folding
 - ☒ b. Lipid synthesis and detoxification
 - c. ATP production and aerobic respiration
 - d. DNA replication and cell division
18. The centromere is important because it:
 - a. Synthesizes proteins
 - ☒ b. Holds identical chromatids together
 - c. Replicates DNA
 - d. Produces ATP
19. Which of the following correctly describes the action of the sodium-potassium pump in a resting neuron?

110. Steady current in a metallic conductor is due to the _____ under an electric field.

- a. Directed flow of free electrons
- ☒ b. Random electron motion
- c. Positive ion movement
- d. Continuously changing electron flow

111. Which expression correctly represents the SI unit of magnetic flux density?

- a. $NA^{-1}m^{-1}$
- b. $NA^{-1}m$
- c. NC^{-1}
- ☒ d. $Wb\ m^{-2}$

$$\phi = A \cdot B$$

$$B = \frac{\phi}{Am}$$

112. If the number of turns of a coil is doubled while the rate of change of magnetic flux remains constant, the induced e.m.f. will be:

- a. Halved
- b. Unchanged
- ☒ c. Doubled
- d. One-fourth

$$e = \frac{\Delta \phi}{\Delta t}$$

$$1 \cdot \frac{\Delta \phi}{\Delta t}$$

113. In an alternating current wave, the phase of the maximum positive value is:

- a. 0°
- ☒ b. 90°
- c. 180°
- d. 270°

114. When a diode is reverse biased, it:

- a. Almost stops the current
- ☒ b. Reduces the resistance of the junction
- c. Allows current to pass
- d. Increases the current

115. According to Planck's theory, an atom in one quantum state:

- a. Emits energy continuously
- b. Absorbs energy continuously
- ☒ c. Neither emits nor absorbs energy
- d. Emits one photon every second

116. Which type of spectrum consists of bright lines of various frequencies?

- ☒ a. Line emission
- b. Line absorption
- c. Continuous
- d. Band

117. The half-life of a radioactive element is:

- a. Constant
- ☒ b. Variable
- c. Dependent on the quantity
- d. Dependent on temperature and pressure

118. What is the mass of 1 mole of calcium carbonate ($CaCO_3$)? (Molar mass of calcium: 40 g/mol, carbon: 12 g/mol, oxygen: 16 g/mol)

- a. 25 g
- b. 50 g
- c. 75 g
- ☒ d. 100 g

119. A limiting reagent:

- a. Is present in maximum amount
- b. Produces minimum number of moles of product
- ☒ c. Produces maximum number of moles of product

120. Which of the following is a CORRECT statement about yield?

- a. Theoretical yield is the amount of product that is actually produced experimentally during a chemical reaction
- b. The percent yield of a reaction tells us the total mass of the reactants used in the reaction
- c. Chemists use percentage yield to express the efficiency of a chemical reaction
- d. Actual yield is the amount of the product calculated based on a balanced chemical equation

121. The shape of an orbital depends on the _____ quantum number.

- ☒ a. Azimuthal
- b. Magnetic
- c. Principle
- d. Spin

122. According to Pauli's Exclusion Principle, no two electrons in an atom can have the same set of _____ quantum numbers.

- a. Two
- b. Three
- ☒ c. Four
- d. Five

123. What is the electronic configuration of Calcium?

- a. $[Ar], 4s^1$
- b. $[Ar], 4s^2$
- ☒ c. $[Ne], 3s^2$
- d. $[He], 2s^2$

124. The average kinetic energy of gas molecules is directly proportional to _____ of the gas.

- a. Density
- b. Pressure
- ☒ c. Absolute temperature
- d. Volume

125. If the pressure of a gas is doubled at constant temperature, its volume will:

- a. Double
- ☒ b. Halve
- c. Remain unchanged
- d. Triple

126. If the absolute temperature of a gas doubles at constant pressure, its volume will:

- a. Remain unchanged
- ☒ b. Double
- c. Halve
- d. Triple

127. Absolute zero is equal to _____ $^\circ C$.

- a. -100
- b. -173
- ☒ c. -273
- d. -373

128. The kinetic energy of liquid molecules is _____ compared to that of solids.

- a. Constant
- b. Equal
- ☒ c. Greater
- d. Lower

CHEMISTRY

149. Which carbon chain is selected first when assigning the IUPAC name of an alkene?
- Cyclic carbon chain
 - Most highly branched carbon chains
 - ☒ Longest with maximum number of double bonds
 - Longest with maximum number of triple bonds
150. Which method prepares an alkene by removing water from an alcohol?
- Dehydration
 - ☒ Dehydrohalogenation
 - Halogenation
 - Hydrogenation
151. Which statement best describes the structure of benzene? It is a:
- Planar molecule with six sp^2 hybridized carbon atoms
 - ☒ Tetrahedral molecule with six sp^3 hybridized carbon atoms
 - Linear molecule with sp hybridized carbon atoms
 - ☒ Non-planar molecule with alternating single and double bonds
152. Compared with alkenes, benzene undergoes _____ reaction to retain its aromatic character.
- Addition
 - Elimination
 - Polymerization
 - ☒ Substitution
153. Hydration of ethyne in the presence of H_2SO_4 and $HgSO_4$ ($100^\circ C$) ultimately gives:
- Acetaldehyde
 - Acetic acid
 - Ethanol
 - ☒ Ethene
154. According to IUPAC, when two different halogens are present in a haloalkane at the same position, which rule is used to decide which substituent is written first?
- ☒ Alphabetical
 - Branching
 - Chain length
 - Molecular mass
155. Which alkyl halide has the highest carbon-halogen bond energy?
- C-Br
 - C-Cl
 - ☒ C-F
 - C-I
156. An alcohol that produces cloudiness immediately with Lucas reagent is:
- Primary
 - ☒ Secondary
 - Tertiary
 - Trihydric
157. Reduction of an ester with lithium aluminium hydride mainly produces:
- Alkene
 - ☒ Alcohol
 - Aldehyde
 - Ketone
158. Which carbonyl compound is generally more reactive toward nucleophilic addition?
- Aldehyde
 - Alcohol
 - Ether
 - ☒ Ketone
159. Which reagent distinguishes aldehydes from ketones by producing a silver mirror?
- Benedict's
 - Clemmensen
 - Fehling's
 - ☒ Tollen's
160. Which of the following protein-prosthetic group combinations is correctly matched?
- Chromoproteins - Carbohydrates
 - ☒ Glycoproteins - Lipids
 - Lipoproteins - Lipids
 - ☒ Nucleoproteins - Carbohydrates
161. A manufacturer needs an adhesive that solidifies on cooling and is widely used in bookbinding and packaging. Which type of adhesive is most suitable?
- Contact
 - ☒ Hot-melt
 - Pressure-sensitive
 - Solvent-based
162. Which polymer is produced through condensation polymerization?
- ☒ Nylon-6,6
 - Polyethene
 - Polyvinyl chloride *PVC*
 - Polystyrene
163. I like cake, however my friend likes chocolate. The transitional device is used for:
- Exception
 - Sequence
 - Addition
 - ☒ Contrast
164. Electric cars are becoming increasingly popular due to concerns about air pollution and fossil fuels. They produce zero emissions and are powered by rechargeable batteries. According to the passage, why are electric cars becoming popular?
- They are faster than other cars.
 - They are cheaper to manufacture.
 - ☒ They reduce air pollution.
 - They use petrol efficiently.
165. Which of the following sentences uses the gerund as a subject?
- I love singing in the shower.
 - Singing is my favorite hobby.
 - She is singing a beautiful song.
 - ☒ The singing bird is a nightingale.
166. My cat is hiding _____ the bed. Use correct preposition.
- From
 - Inside
 - ☒ Under
 - To