



National Level Science Talent Search Examination

Conducted by

UNIFIED COUNCIL

An ISO 9001 Certified organization

CLASS XI (PCB)

Please fill the following details immediately

Name _____

Hall Ticket No. _____

Questions : 60

Time : 60 minutes

INSTRUCTIONS

Read all instructions carefully before attempting any question.

- Ensure that the 'Class' printed here and inside, is the same as the test you are appearing for.
- You must complete the paper within the time allotted.
- Do not open this question paper until you are permitted to.
- You are not allowed to use a calculator.
- Figures herein are not to scale. Hence, you cannot depend on the estimate of size or measurement. Use your knowledge of the subject.
- Rough work shall be carried out only in the space provided for the same throughout this booklet. No separate sheets are allowed for the same.
- Return your answer sheet to the invigilator soon after completion and before leaving the examination hall. Take the question paper with you.
- There is no negative marking.
- Results would be made available on www.unifiedcouncil.com

Conducted by

PAPER CODE UN456



UCN/QP-XI(PCB)/01



UNIFIED COUNCIL

INDIA'S 1st ISO 9001:2015 Certified Organisation In Testing & Assessment

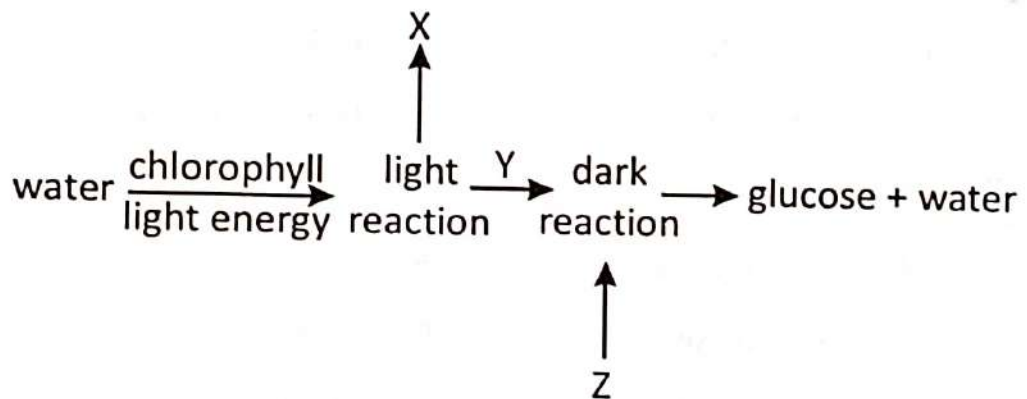
Foundation for Success

www.unifiedcouncil.com

- 01** Oxyhaemoglobin dissociates into oxygen and deoxyhaemoglobin at
- (A) low O_2 pressure in tissue
 - (B) high O_2 pressure in tissue
 - (C) equal O_2 pressure inside and outside tissue
 - (D) all times irrespective of O_2 pressure
- 02** Hydrolytic enzyme which acts as low pH is
- (A) α -amylase
 - (B) protease
 - (C) hydrolases
 - (D) peroxidases
- 03** Ornithine cycle is related to
- (A) respiration
 - (B) excretion
 - (C) digestion
 - (D) nutrition
- 04** Sericteris (silk gland) are modified
- (A) intestinal gland
 - (B) gastric gland
 - (C) salivary gland
 - (D) endocrine glands
- 05** Which one is not a larval stage of flatworm ?
- (A) Redia
 - (B) Cercaria
 - (C) Bipinnaria
 - (D) Miracidium
- 06** Ascaris larva is called:
- (A) cysticercus
 - (B) rhabditiform
 - (C) hexacanth
 - (D) onchosphere

SPACE FOR ROUGH WORK

- 07** Which of the following conditions would cause plants to wilt ?
- (A) High atmospheric humidity
 (B) Higher rate of transpiration than that of water uptake
 (C) Low light intensity
 (D) Low temperature
- 08** The flow chart below summarises the photosynthetic process.



Which of the following represents X, Y and Z ?

	X	Y	Z
(A)	Carbon dioxide	Hydrogen	Oxygen
(B)	Oxygen	Hydrogen	Carbon dioxide
(C)	Hydrogen	Oxygen	Carbon dioxide
(D)	Hydrogen	Carbon dioxide	Oxygen

SPACE FOR ROUGH WORK

- 09** Which of the following correctly identifies the enzyme present in saliva, its substrate and the product of the enzyme-catalysed reaction ?

	Enzyme	Substrate	Product
(A)	Lipase	Protein	Amino acids
(B)	Amylase	Starch	Maltose
(C)	Maltase	Starch	Glucose
(D)	Amylase	Fat	Glycerol

- 10** Which of the following can be absorbed in the human alimentary canal without further digestion ?

- (A) Water, glucose, fats and minerals
 (B) Water, glucose, minerals and vitamins
 (C) Water, glucose, enzymes and amino acids
 (D) Glucose, vitamins, starch and amino acids

- 11** One gene and one enzyme concept was given by

- (A) Temin and Baltimore (B) Jacob and Monod
 (C) Beadle and Tatum (D) Tatum and Lederberg

- 12** 'Energy currency' is the term used for

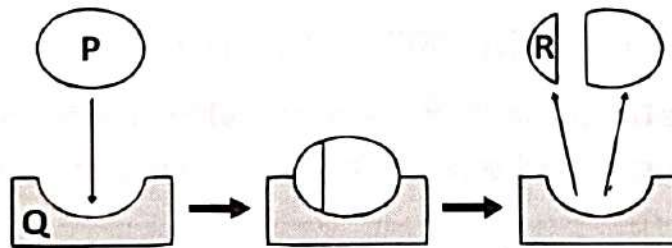
- (A) mitochondrion (B) ATP
 (C) ADP (D) respiration

- 13** When genetic name is repeated in specific name of a plant it is called

- (A) synonym (B) autonym
 (C) tautonym (D) none above

- 14** In kingdom animalia according to the traditional school of systematics, birds are assigned to a different group from reptiles because
- (A) they are evolved from reptiles
(B) they are quite different from reptiles
(C) feathers came from scales
(D) all of these are correct
- 15** Antiviral substance formed by many vertebrate animals in response to viral infection, for resisting the multiplication of viruses is known as
- (A) antivirin (B) antigen
(C) virion (D) interferon
- 16** A bacterium, which is capable of utilising the most abundantly available gas in the atmosphere for one of its metabolic pathways, but cannot utilise the second abundantly available gas for its another metabolic pathway, is
- (A) Azotobactor (B) Clostridium
(C) Rhodomicrobium (D) Xanthomonas
- 17** Exogenous budding is shown by
- (A) Amoeba (B) Hydra
(C) Spongilla (D) Euglena
- 18** Algae used for the manufacture of iodine is
- (A) Nostoc (B) Laminaria
(C) Polysiphonia (D) Diatoms

- 19** Which of the following is an example of crustose lichen ?
 (A) Parmelia (B) Cladonia
 (C) Usnea (D) Graphis
- 20** Which of the following annelid is common known as the sea-mouse ?
 (A) Aphrodite (B) Aplysia
 (C) Polynoe (D) Chaetopterus
- 21** Basic unit in the eye of cockroach/insect is
 (A) retina (B) corneal facet
 (C) rhadome (D) ommatidium
- 22** The diagram below shows the stages in the breakdown of starch by an enzyme, amylase.



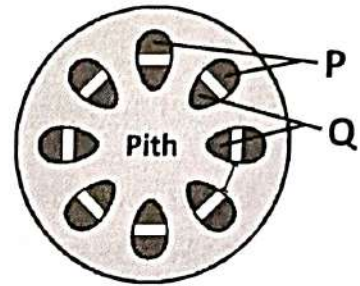
What do letters P, Q and R represent

	P	Q	R
(A)	Amylase	Starch	Maltose
(B)	Starch	Amylase	Maltose
(C)	Starch	Maltose	Amylase
(D)	Maltose	Amylase	Starch

SPACE FOR ROUGH WORK

23 Observe the given diagram and identify P and Q.

- (A) P - Phloem, Q - Xylem
- (B) P - Xylem, Q - Phloem
- (C) P - Xylem, Q - Procambium
- (D) P - Procambium, Q - Phloem



24 Which of the following responses occur when the adrenal glands are stimulated ?

- (i) The rate of heartbeat increases
- (ii) The rate of blood pressure increases
- (iii) Blood sugar level decreases
- (iv) Size of pupil increases

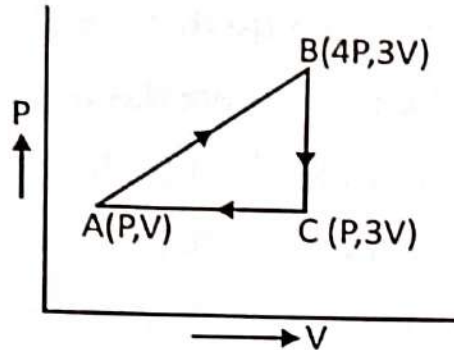
- (A) (i) and (ii) only
- (B) (i), (ii) and (iii) only
- (C) (i), (ii) and (iv) only
- (D) (i), (ii), (iii) and (iv)

25 A diabetic patient is treated with hormone X. What is hormone X and why is it used to treat the disease ?

	Hormone X	Function
(A)	Glucagon	Stimulates the absorption of glucose in the small intestine
(B)	Glucagon	Stimulates the conversion of glucose to glycogen
(C)	Insulin	Stimulates the conversion of glucose to glycogen
(D)	Insulin	Stimulates the conversion of glycogen to glucose

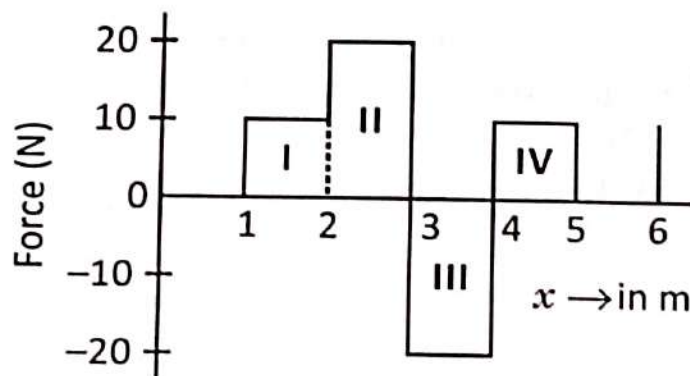
- 30** Which of the given statements is true ?
- (A) Intermolecular forces are weaker than interatomic forces.
 - (B) Intermolecular forces are van der Waals forces.
 - (C) The substance is in a state of equilibrium when the distance between the molecules is equal to normal distance.
 - (D) All of the above
- 31** Three uniform spheres of mass M and radius R each are kept in such a way that each touches the other two. The magnitude of the gravitational force on any of the spheres due to the other two is
- (A) $\frac{\sqrt{3} GM^2}{4 R^2}$
 - (B) $\frac{3 GM^2}{2 R^2}$
 - (C) $\frac{\sqrt{3} GM^2}{R^2}$
 - (D) $\frac{\sqrt{3} GM^2}{2 R^2}$
- 32** The ratio of root mean square velocities of O_3 and O_2 is
- (A) 1 : 1
 - (B) 2 : 3
 - (C) 3 : 2
 - (D) $\sqrt{2} : \sqrt{3}$
- 33** A ball of mass 0.50 kg is thrown with a speed of 10 m/s. A stationary receiver catches the ball and brings it to rest in 0.02 s. What is the impulse delivered to the ball and the average force exerted on the receiver ?
- (A) -5 N s , 250 N
 - (B) -7 N s , 300 N
 - (C) -9 N s , 400 N
 - (D) -6 N s , 600 N

- 34 A sample of ideal monoatomic gas is taken round the cycle ABCA as shown below.



Work done during the cycle is

- (A) Zero (B) $3 PV$ (C) $6 PV$ (D) $9 PV$
- 35 A ball is thrown from a point with a speed v_0 at an angle of projection θ . From the same point and at the same instant a person starts running with a constant speed $v_0/2$ to catch the ball. Will the person be able to catch the ball? If yes, what should be the angle of projection?
- (A) yes, 60° (B) yes, 30°
(C) yes, 45° (D) no
- 36 The relationship between force and position of a body moving along x -axis, is as shown below. What is the work done by the force in displacing the body from $x = 1$ m to $x = 5$ m?

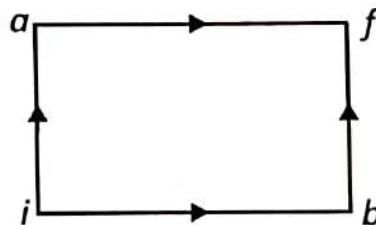


- (A) 15 J (B) 20 J (C) 27 J (D) 35 J

- 37** With what speed the earth has to rotate on its axis so that a person on the equator weighs $\left(\frac{3}{5}\right)$ th as much as at present. Take the equatorial radius as 6400 km.
- (A) $9.157 \times 10^{-5} \text{ rad. s}^{-1}$ (B) $7.826 \times 10^{-4} \text{ rad. s}^{-1}$
 (C) $5.369 \times 10^{-9} \text{ rad. s}^{-1}$ (D) $3.735 \times 10^{-6} \text{ rad. s}^{-1}$

- 38** A barometer tube reads 76 cm of mercury. If the tube is gradually inclined at an angle of 60° with vertical, keeping the open end immersed in the mercury reservoir, the length of the mercury column will be:
- (A) 152 cm (B) 76 cm
 (C) 38 cm (D) $38\sqrt{3}$ cm

- 39** When a system is taken from state i to state f along the path iaf , it is found that $Q = 50 \text{ cal}$ and $W = 20 \text{ cal}$. Along the path ibf , $Q = 36 \text{ cal}$. W along the path ibf is



- (A) 14 cal (B) 6 cal (C) 16 cal (D) 66 cal
- 40** A blind person after walking 10 steps in one direction, each of length 80 cm, turns randomly to the left or the right by 90° . After walking a total of 40 steps the maximum displacement of the person from his starting position could be
- (A) 32 m (B) $16\sqrt{(5/2)} \text{ m}$
 (C) $16\sqrt{5}$ (D) none of the above

41 Which pair of elements are found in the same period of the Periodic Table ?

- (A) Sulfur and selenium
- (B) Strontium and calcium
- (C) Calcium and germanium
- (D) Potassium and barium

42 A compound was found to have the following percentage composition by mass: sodium (Na), 37.5%; silicon (Si), 23%; oxygen (O), 39.5%. What is the empirical formula of this compound ?

- (A) NaSiO
- (B) Na₂SiO₂
- (C) Na₂SiO₃
- (D) Na₅Si₃O₅

43 The rate of diffusion of oxygen as compared with ozone will be

- (A) 1.5 times
- (B) 1.22 times
- (C) 0.66 times
- (D) 0.82 times

44 In the reaction, $\text{H}_2 + \text{I}_2 \rightleftharpoons 2\text{HI}$ the concentrations of H₂, I₂ and HI at equilibrium are 8.0, 3.0 and 28.0 moles per litre respectively. Determine the equilibrium constant.

- (A) 28.14
- (B) 32.66
- (C) 45.73
- (D) 59.16

45 The oxidation states of the most electronegative element in the products of the reaction, BaO₂ with dil.H₂SO₄ are

- (A) 0 and -1
- (B) -1 and -2
- (C) -2 and 0
- (D) -2 and +1

- 46 In the reaction $\text{BF}_3 + 3\text{LiBH}_4 \longrightarrow 3\text{LiF} + \text{X}$; X is
- (A) B_4H_{10} (B) B_2H_6
(C) BH_3 (D) B_3H_8
- 47 100 mL of 0.1 M solution of solute A are mixed with 200 mL of 0.2 M solution of solute B and the solution diluted to 500 mL. If A and B are non-interacting substances, the molarity of the final solution will be
- (A) 0.1 M (B) 0.4 M
(C) 0.2 M (D) 0.5 M
- 48 Solubility of alkaline earth metal sulphates decreases down the Group 2 because
- (A) the sum of first and second ionization enthalpies is high
(B) lattice enthalpies of sulphates do not decrease so rapidly
(C) enthalpy of hydration of bivalent metal ions decreases rapidly
(D) they become more ionic
- 49 A compound with molecular formula $\text{C}_4\text{H}_4\text{O}$ has all the four carbon atoms and the oxygen atom in the ring. It also has two double bonds. The compound is
- (A) Homocyclic and aromatic
(B) Heterocyclic and aromatic
(C) Homocyclic but not aromatic
(D) Heterocyclic but not aromatic

- 50** The dipole moment of KCl is 3.336×10^{-29} coulomb-metre which indicates that it is a highly polar molecule. The interatomic distance between K^+ and Cl^- in this molecule is 2.6×10^{-10} m. Calculate the dipole moment of KCl molecule if there were opposite charges of one fundamental unit located at each nucleus. Calculate the percentage of ionic character of KCl .
- (A) 52.9 (B) 63.5
(C) 71.6 (D) 80.1
- 51** What would be the heat released when, 0.25 mole of hydrochloric acid in solution is neutralised by 0.25 mole of sodium hydroxide solution ?
- (A) 10.2 kJ (B) 11.5 kJ
(C) 12.9 kJ (D) 14.3 kJ
- 52** The oxidation number of N and Cl in $NOClO_4$ respectively are
- (A) + 2 and + 7 (B) + 3 and + 7
(C) - 3 and + 5 (D) + 2 and - 7

SPACE FOR ROUGH WORK

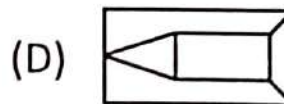
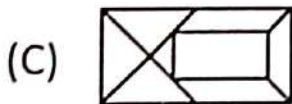
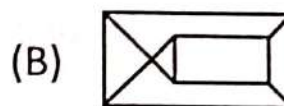
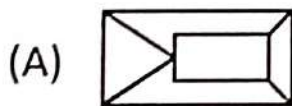
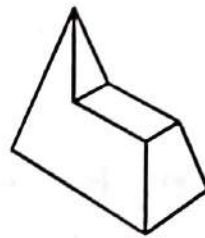
- 53 The reactivity of the alkali metal sodium with water, is made use of ?
- (A) In drying of alcohols
 - (B) In drying on benzene
 - (C) In drying of ammonia solution
 - (D) As a general drying agent
- 54 Calculate the wavelength of an electron moving with a velocity of $2.05 \times 10^7 \text{ m s}^{-1}$.
- (A) $1.896 \times 10^{-3} \text{ m}$
 - (B) $2.351 \times 10^{-9} \text{ m}$
 - (C) $3.552 \times 10^{-11} \text{ m}$
 - (D) $5.126 \times 10^{-13} \text{ m}$
- 55 Which of the following pairs of compounds are not functional isomers ?
- (A) Glucose and fructose
 - (B) Methyl cyanide and methyl isocyanide
 - (C) 2-Pentanone and 3-pentanone
 - (D) Nitromethane and methyl nitrite

SPACE FOR ROUGH WORK

56 If highways were restricted to cars and only those trucks with capacity of less than 8 tons, most of the truck traffic would be forced to run outside highways. Such a reduction in the amount of truck traffic would reduce the risk of collisions on highways. The conclusion drawn in the 1st sentence depends on which of the following assumptions ?

- (A) The roads outside highway would be as convenient as highway for most drivers of trucks.
- (B) Most of the roads outside highways are not ready to handle truck traffic.
- (C) Most trucks that are currently running in highway have a capacity of more than 8 tons.
- (D) Cars are at greater risk of being involved in collisions than are trucks.

57 For the given solid, identify the correct top view.



SPACE FOR ROUGH WORK

- 58** (i) An earthquake of magnitude 8.2 rocked the islands of Maldives.
- (ii) A devastating Tsunami struck the coastal belt of Maldives.
- (A) If statement (i) is the cause & statement (ii) is its effect.
(B) If statement (ii) is the cause & statement (i) is its effect.
(C) If both the statements (i) & (ii) are independent causes.
(D) If both the statements (i) & (ii) are effects of independent causes

- 59** A sealed envelope contains a card with a single digit on it. Three of the following statements are true and the other is false.

- I) The digit is 1. II) The digit is not 2.
III) The digit is 3. IV) The digit is not 4.

Which one of the following must necessarily be correct ?

- (A) I is false (B) II is true
(C) III is true (D) IV is false

- 60** If $P + Q$ means P is the brother of Q ; $P \times Q$ means P is the wife of Q and $P \% Q$ means P is the daughter of Q then which of the following means D is the uncle of A ?

- (A) $A \% B \times C + D$ (B) $A \times B + C \% D$
(C) $A \% B + C \times D$ (D) None of these

SPACE FOR ROUGH WORK