

Please mark with an "X" the letter corresponding to the right answer

**1 Which among the following acids is present in a human stomach?**

- A Sulphuric acid
- B Hydrochloric acid
- C Nitric acid
- D Picric acid
- E None of the above

**2 The major role of the white blood cell is .....**

- A To defend from the infections
- B To provide energy
- C To help in blood clotting
- D To help in breathing
- E None of the above

**3 Malfunctioning of ..... causes diabetes**

- A Heart
- B Kidneys
- C Pancreas
- D Spleen
- E None of the above

**4 Which among the following terms define the scientific study of teeth?**

- A Odontology
- B Ophthalmology
- C Omithology
- D Osteology
- E None of the above

**5 Which among the following is invented by Edward Jenner?**

- A Inoculation of TB
- B Inoculation of yellow fever
- C Inoculation of polio
- D Inoculation of smallpox
- E None of the above

**6 Who among the following has discovered penicillin?**

- A Alexander Fleming
- B Robert Hook
- C Christopher Columbus
- D Pierre Simon Laplace
- E None of the above

**7 Chromosomes are:**

- A Found only in the cytoplasm of a cell
- B The highest in number in human cells
- C Carrying genetic information in the form of genes
- D Visible in all cells at every time
- E None of the above

**8 In the process of photosynthesis, chlorophyll ...**

- A Absorbs sunlight
- B Absorbs water
- C Absorbs carbon dioxide
- D Releases oxygen
- E None of the above

**9 Which among the following correctly defines the sea horse?**

- A Fish class
- B Mammals class
- C Reptiles class
- D Mollusk class
- E None of the above

**10 The Hepatitis-B, which affects the human liver, is a ...**

- A Virus
- B Bacterium
- C Protozoan
- D Helminth
- E None of the above

- 11 Which among the following hormones controls production of the thyroid?**
- A Melatonin  
 B TS hormone  
 C Progesterone  
 D Testosterone  
 E None of the above
- 12 Which among the following is accountable for the maximum fixation of solar energy?**
- A Bacteria  
 B Protozoa  
 C Fungi  
 D Green plants  
 E None of the above
- 13 Which among the following blood groups is a universal donor?**
- A Blood group AB  
 B Blood group A  
 C Blood group B  
 D Blood group O  
 E None of the above
- 14 Consider the following statements:**
1. RNA is ribonucleic acid.
  2. RNA is used for information transport (known as mRNA).
- Choose the correct answer from the given codes:
- A Only 1  
 B Only 2  
 C Both  
 D Neither 1 nor 2  
 E None of the above
- 15 Which among the following is essential in food digestion?**
- A Enzyme  
 B Water  
 C Air  
 D Mineral  
 E None of the above
- 16 Which among the following is a hereditary disease?**
- A Cholera  
 B TB  
 C Haemophilia  
 D Cancer  
 E None of the above
- 17 Consider the following statements:**
1. The best-known role of proteins in the cell is as enzymes.
  2. Enzymes catalyze chemical reactions.
- Choose the correct answer from the given codes:
- A Only 1  
 B Only 2  
 C Both  
 D Neither 1 nor 2  
 E None of the above
- 18 Thrombosis is ...**
- A Formation of a blood clot in a blood vessel  
 B Contagious virus disease  
 C Skin disease  
 D Heart disease  
 E None of the above
- 19 The organism that eats everything is known as ...**
- A Herbivores  
 B Carnivores  
 C Autotrophs  
 D Omnivores  
 E None of the above

- 20 Consider the following statements:**  
 1. Cells are of two types, eukaryotic and prokaryotic.  
 2. Plants consist eukaryotic cells and animals consist prokaryotic cells.  
 Choose the correct answer from the given codes:  
 A Only 1  
 B Only 2  
 C Both  
 D Neither 1 nor 2  
 E None of the above
- 21 A cheetah can accelerate from rest to a speed of 30.0 m/s in 7.00 s. What is its acceleration?**  
 A  $0.23 \text{ m/s}^2$   
 B  $21 \text{ m/s}^2$   
 C  $4.29 \text{ m/s}^2$   
 D  $9.8 \text{ m/s}^2$   
 E None of the above
- 22 Starting from the rest, an ambulance with an acceleration of  $2.50 \text{ m/s}^2$ , in 10 seconds cover a distance of?**  
 A 125 m  
 B 62.5m  
 C  $62.5 \text{ m/s}$   
 D  $62.5 \text{ m/s}^2$   
 E 25 m
- 23 A 63.0-kg sprinter starts a race with an acceleration of  $4.20 \text{ m/s}^2$ . What is the net external force on him?**  
 A 1111 N  
 B 265 N  
 C 0.07 N  
 D 15 N  
 E None of the above
- 24 In a uniform circular motion..**  
 A there is a constant velocity  
 B there is not a constant speed  
 C the velocity is zero  
 D there is no acceleration  
 E None of the above
- 25 A car travels 2 km in 100 s. What is the average speed?**  
 A  $20 \text{ m/s}$   
 B  $50 \text{ m/s}$   
 C  $0,02 \text{ m/s}$   
 D  $-0,02 \text{ m/s}$   
 E  $5 \text{ m/s}$
- 26 What is the energy needed to lift a 30 kg box by one meter?**  
 A 30 J  
 B 294 J  
 C 300 W  
 D 30W  
 E None of the above
- 27 What is the power output in watts of a shot-putter who takes 1.20 s to accelerate the 7.27-kg shot from rest to  $14.0 \text{ m/s}$ , while raising it 0.8 meters?**  
 A 641J  
 B 98J  
 C 98W  
 D 641W  
 E None of the above
- 28 How high must climb the stairs, an 80 kg man, to burn 1000kj (about 250 Kcal) of a chocolate bar?**  
 A 1.275m  
 B 12.75m  
 C 127.5m  
 D 1275m  
 E 12750m
- 29 Select the correct expression equivalent to  $5^2 + 2^2$**   
 A  $(5 + 2)^2$   
 B  $7^2$   
 C  $(5 + 2)^4$   
 D  $\sqrt{29^2}$   
 E None of the above

- 30 If  $e = mc^2$ , then  $c$  is given by
- A  $e/m$   
 B  $(e/m)^{1/2}$   
 C  $(m/e)^{1/3}$   
 D  $(m/e)^{1/2}$   
 E None of the above
- 31 If  $x=0.2456E+01$  (output of your scientific calculator), select the correct approximation with rounding up to two significant digits
- A 0.24E+01  
 B 0.246E+01  
 C 0.245E+01  
 D 0.25E+01  
 E None of the above
- 32 Let  $x$  be a concentration of a certain quantity given by the solution of  $x^2 - K = 0$ . Select the correct answer.
- A  $x = \pm\sqrt{K}$   
 B  $x = \sqrt{|K|}$  for any  $K$   
 C  $x = \sqrt{K}$ , if  $K > 0$   
 D  $x=K$   
 E None of the above
- 33 Mark the correct solution of the equation  $e^x = -1$
- A  $-1/e$   
 B  $\ln(-1)$   
 C no solution  
 D  $x = \log_{10}e$   
 E None of the above
- 34 Compute the sum of  $5/9 + 8/15$
- A  $49/45$   
 B  $13/24$   
 C  $13/15$   
 D  $50/45$   
 E None of the above
- 35  $x^4 - y^4$  is equivalent to
- A  $(x - y)(x + y)(x^2 + y^2)$   
 B  $(x^2 - y^2)^2$   
 C  $y^4 - x^4$   
 D  $(x - y)^4$   
 E None of the above
- 36 In alkali solutions, hydrogen peroxide ( $H_2O_2$ ) converts the sulphide anion ( $S^{2-}$ ) into sulphate anion ( $SO_4^{2-}$ ). Which sentence is correct?
- A Sulphur oxidation state goes from +2 to +6 and is oxidised  
 B Sulphur oxidation state goes from +2 to +6 and is reduced  
 C Sulphur oxidation state goes from -2 to +6 and is oxidised  
 D Sulphur oxidation state goes from -2 to +6 and is reduced  
 E Sulphur oxidation state goes from -2 to -6 and is reduced
- 37 Phosphate anion brutto formula is:
- A  $HPO_3^{2-}$   
 B  $PO_4^{3-}$   
 C  $H_2PO_2^{2-}$   
 D  $P_2O_7^{2-}$   
 E  $PO_4^{2-}$
- 38 The molar mass of nitrogen (N) is  $14 \text{ gmol}^{-1}$ . How many atoms are contained into 0.7 g of N?
- A 0.05  
 B  $6.022 \times 10^{22}$   
 C  $3.011 \times 10^{22}$   
 D  $5.902 \times 10^{24}$   
 E  $0.7 \times 10^{23}$
- 39 The pH of a  $H_3O^+$  0.0001 M water solution is:
- A 3  
 B 5  
 C 10  
 D 4  
 E 7

- 40 How many grams of ethanol ( $\text{CH}_3\text{CH}_2\text{OH}$ ,  $\text{MW}=46.068$ ) are into 500 mL of a 2M solution?**
- A About 23  
 B About 4.6  
 C About 46  
 D About 2.3  
 E About 0.46
- 41 Methylamine is:**
- A An ionic compound  
 B A compound with a hydroxyl group  
 C A compound with a  $\text{NH}_2$  group  
 D A hydrocarbon  
 E A compound containing a heavy metal
- 42 Which of these atom pairs give ionic bonds?**
- A C,H  
 B C,F  
 C N,H  
 D H,I  
 E Na,F
- 43 A solution of water and methanol (completely miscible) constitute a system:**
- A Chemically and physically homogeneous  
 B Chemically homogeneous but physically heterogeneous  
 C Physically homogeneous but chemically heterogeneous  
 D Chemically and physically heterogeneous  
 E That can be separated by filtration
- 44 Which chemical reaction occurs in a car engine?**
- A Precipitation  
 B Hydrolysis  
 C Redox  
 D Saponification  
 E Combustion
- 45 If the pH of a solution varies from 3 to 6,  $\text{H}_3\text{O}^+$  concentration:**
- A Becomes the half  
 B Doubles  
 C Decreases by 1000 times  
 D Increases of 5 units  
 E Increases by 1000 times
- 46 To neutralize 200 mL of NaOH 0.01M you need:**
- A 200 mL of KOH 0.01M  
 B 200 mL of  $\text{H}_2\text{O}$   
 C 200 mL of  $\text{HNO}_3$   $10^{-1}$  M  
 D 20 mL of  $\text{HNO}_3$   $10^{-1}$  M  
 E 2 mL of  $\text{HCl}$   $10^{-2}$  M
- 47 At  $T=0^\circ\text{C}$  and  $P=1$  atm, 4 moles of gas:**
- A Weigh about 89.6 g  
 B Occupy a volume of 22.4 L  
 C Occupy a volume of 89.6 L  
 D Weigh about 4 g  
 E Contain about 4 molecules
- 48 Which of the following ratios is a concentration?**
- A Force/Area  
 B Mass/Volume  
 C Charge/Length  
 D Number of moles/Volume  
 E Number of molecules/Number of moles
- 49 If 5 g of  $\text{ZnCl}_2$  are dissolved into water and the final solution is diluted to 100 mL with water, the concentration is:**
- A 5g/L  
 B 50g/L  
 C 500g/L  
 D 0.5g/L  
 E 0.05g/L
- 50 Which of the following elements is more reactive?**
- A Na  
 B C  
 C  $\text{O}_2$   
 D  $\text{N}_2$   
 E Ar

- 51 What is the capital city of the Philippines?**  
A Jakarta  
B Manilla  
C Dili  
D Kuala Lumpur  
E None of the above
- 52 What is the capital city of Kenya?**  
A Dakkar  
B Nairobi  
C Lagos  
D Maputo  
E None of the above
- 53 What instrument did the jazz musician Miles Davis play?**  
A Saxophone  
B Trumpet  
C Piano  
D Guitar  
E None of the above
- 54 Who wrote the song entitled 'Yesterday'?**  
A Paul McCartney  
B Freddie Mercury  
C Mick Jagger  
D Steven Tyler  
E None of the above
- 55 World War I began in which year?**  
A 1923  
B 1938  
C 1917  
D 1910  
E None of the above
- 56 Who is the only president to serve more than two terms?**  
A George W Bush  
B George Washington  
C Ronald Reagan  
D Franklin D. Roosevelt  
E Abraham Lincoln
- 57 What scientist is well known for 'discovering' gravity?**  
A Aristotle  
B Albert Einstein  
C Isaac Newton  
D Galileo Galilei  
E None of the above
- 58 Which of these countries was considered part of the Axis in World War II?**  
A United Kingdom  
B China  
C Japan  
D France  
E None of the above
- 59 What important American document was put into effect in 1789?**  
A US Constitution  
B Declaration of Independence  
C Monroe Doctrine  
D Articles of Confederation  
E None of the above
- 60 What is the name of Adolf Hitler's infamous autobiography?**  
A Deutschlands Zukunft  
B Der Wahre Held  
C Die Jüdische Bedrohung  
D Mein Kampf  
E None of the above