

**Admission test -Degree Course in Pharmacy, University of Rome "Tor Vergata", Academic Year 2018/2019**

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

- 1 Cardiac muscles consume more energy than any other cell type. Which organelle would you expect to be most abundant in cardiac muscle cells?**
- A Golgi apparatus
  - B Mitochondria
  - C Vacuole
  - D Lysosome
  - E Ribosome
- 2 Genetic information usually flows in one specific direction. Which of the following best represents this flow?**
- A DNA vs Protein vs RNA
  - B Protein vs RNA vs DNA
  - C RNA vs Protein vs DNA
  - D DNA vs RNA vs Protein
  - E None of the above
- 3 The maximum fixation of solar energy is made by:**
- A Green plants
  - B Fungi
  - C Protozoa
  - D Bacteria
  - E Alghe
- 4 Outside the nucleus DNA is found in:**
- A Mitochondria
  - B Peroxisomes
  - C Golgi apparatus
  - D Endoplasmic reticulum
  - E Lysosomes
- 5 The sleeping sickness is caused by:**
- A Escherichia coli
  - B Neisseria
  - C Entamoeba
  - D Trypanosoma
  - E None of the above
- 6 The male sex hormone is:**
- A Insulin
  - B Testosterone
  - C Progesterone
  - D Estrogen
  - E Aldosterone
- 7 The branch of Zoology that deals with the study of animal behaviour is:**
- A Ecology
  - B Physiology
  - C Ethology
  - D Anatomy
  - E Ornithology
- 8 The total interacting animals and plants in a well-defined area is known as:**
- A Population
  - B Biome
  - C Community
  - D Species
  - E Group
- 9 Which blood group is called the "universal donor"?**
- A A
  - B B
  - C O
  - D AB
  - E BO
- 10 Process of cell division can take place by:**
- A Heterosis
  - B Fusion
  - C Mitosis
  - D Apoptosis
  - E None of the above

- 11 In normal sexual reproduction, two mature germ cells fuse to form a:**
- A Gonad
  - B Ovary
  - C Embryo
  - D Zygote
  - E None of the above
- 12 What word corresponds to the following definition: "All the chemical reactions that take place within the cell":**
- A Photosynthesis
  - B Respiration
  - C Mitosis
  - D Decomposition
  - E Metabolism
- 13 An organic compound is one that:**
- A Contains carbon
  - B Is slightly acidic
  - C Forms long chains
  - D Is soluble in water
  - E Is hydrophobic
- 14 A person who receives an extra chromosome, could have:**
- A Heightened intelligence
  - B Down Syndrome
  - C Red eyes
  - D Polygenic traits
  - E None of the above
- 15 If a person receives an X and a Y chromosome, that person is:**
- A Female
  - B Male
  - C Red hair
  - D Mentally challenged
  - E Mutated
- 16 The process by which DNA makes a copy of itself is called:**
- A Synthesis
  - B Replication
  - C Transcription
  - D Translation
  - E None of the above
- 17 A gene is:**
- A A segment of DNA that codes for a protein
  - B A set of homologous chromosomes
  - C A molecule within DNA
  - D A type of pants
  - E None of the above
- 18 What is the pulse rate of an average healthy human being?**
- A 65 beats per minute
  - B Beats per minute
  - C 100 beats per minute
  - D 72 beats per minute
  - E None of the above
- 19 How is the age of a tree determined?**
- A By measuring its height
  - B By measuring its girth
  - C By counting the annual rings in a cut trunk
  - D By counting the number of its branches
  - E None of the above
- 20 Which of the following are known as "pisces"?**
- A Reptiles
  - B Fish
  - C Birds
  - D Mammals
  - E None of the above
- 21 What is the distance covered after 4 seconds by a vertically fallen object?**
- A 7.48 m
  - B 39.2 m
  - C 78.4 m
  - D 19.6 m
  - E 196 m

- 22 What is the final velocity, after 4 seconds, of a vertically fallen object?  
 A 7.48 m/s  
 B 3.92 m/s  
 C 78.4 m/s  
 D 19.6 m/s  
 E 39.2 m/s
- 23 Which physical quantity can be measured in meter per second per second ( $\text{m/s}^2$ ) ?  
 A Force  
 B Acceleration  
 C Kinetic energy  
 D Velocity  
 E Work
- 24 If a stone is projected vertically upwards with a speed of 5 m / s, what is the speed of the stone at the highest point?  
 A 5 m / s  
 B -5 m / s  
 C 10 m / s  
 D -10 m / s  
 E zero m / s
- 25 An ambulance travels for 50 Km in 1 hour, what is its average speed?  
 A 50 m / s  
 B 0.8 m / s  
 C 8 m/s  
 D 5 m/s  
 E 13.9 m/s
- 26 Mark the correct value of  $(a^2)^5$   
 A  $a^9$   
 B  $a^7$   
 C  $a^{\frac{5}{2}}$   
 D  $a^{2^5}$   
 E None of the above
- 27 Which is the correct result of  $\sqrt{x^2}$ ?  
 A  $|x|$   
 B  $x$   
 C  $2x$   
 D  $x^{2/3}$   
 E none of the above
- 28 The value 1.012E-02 appeared on my calculator' screen means:  
 A 0,1012  
 B Error in the representation  
 C 0,01012  
 D 0,001012  
 E None of the above
- 29 Consider the value of  $y = \frac{1}{5} + \frac{1}{4}$ . Mark the correct expression:  
 A  $y < 0$   
 B  $\frac{1}{4} < y < \frac{1}{5}$   
 C  $\frac{2}{5} < y < \frac{1}{2}$   
 D None of the above  
 E All of the above
- 30 Mark the equivalent expression for  $a^2 - b^2$ :  
 A  $(a - b)^2$   
 B  $(a - b)(a + b)$   
 C  $a^2 - b^2 - 2ab$   
 D  $b^2 - a^2$   
 E None of the above
- 31 When the anion  $\text{CrO}_4^{2-}$  is transformed into cation  $\text{Cr}^{3+}$ , Chromium:  
 A Goes from oxidation number +6 to +3 and is oxidized  
 B Goes from oxidation number +6 to +3 and is reduced  
 C Goes from oxidation number -2 to +3 and is reduced  
 D Goes from oxidation number -2 to +3 and is reduced
- 32 Indicate which is the sulfide ion:  
 A  $\text{SO}_4^{2-}$   
 B  $\text{SO}_3^{2-}$   
 C  $\text{S}^{2-}$   
 D  $\text{S}^{2+}$   
 E  $\text{S}_2\text{O}_3^{2-}$

- 33 Which of the following elements is found in nature not combined?  
 A Na  
 B Cu  
 C Al  
 D He  
 E Ca
- 34 What of the following ratios defines density?  
 A Weight/Mass  
 B Mass/Volume  
 C Weight/Length  
 D Energy/Volume  
 E Mass/Length
- 35 Given that the atomic mass of carbon is 12, how many atoms are present in 0,24g of carbon?  
 A 50  
 B 0,02  
 C  $1,2044 \times 10^{22}$   
 D 12  
 E  $6,022 \times 10^{23}$
- 36 If in a water solution the concentration of  $\text{H}_3\text{O}^+$  ions is 0,01M , what is the pH?  
 A 1  
 B 0,01  
 C 2  
 D 20  
 E 7
- 37 How many grams of acetone ( $\text{C}_3\text{H}_6\text{O}$ , MW 58,08) are present in 500mL of a solution 0,2 M?  
 A 5,808 g  
 B  $6,022 \times 10^{23}$  g  
 C  $1,0 \times 10^{23}$  g  
 D 58,08 g  
 E None of the above
- 38 Benzene is:  
 A An organic compound containing a hydroxy group  
 B An aromatic organic compound  
 C A halogenated organic compound  
 D An organic compound containig an amino group  
 E None of the above
- 39 Which of the following solutions has pH  $\text{pH} < 7$ ?  
 A 50 mL of a 0.1 M solution of NaCl  
 B 250 mL of a 0.1 M solution of NaOH  
 C 50 mL of a 0.1 M solution of NaOH  
 D 50 mL of a 0.1 M solution of  $\text{CH}_3\text{CO}_2\text{Na}$   
 E 50 mL of a 0.1 M solution of HCl
- 40 A 0.5 M solution of  $\text{NH}_4\text{Cl}$  contains:  
 A 1 mol of solute per liter of solution  
 B 0.5 moles of solute per liter of solution  
 C 0.5 g of solute per liter of solution  
 D 0.5 g of solute per Kg of solution  
 E 1 mole of solute per Kg of solution
- 41 A gas sample at  $T=0^\circ\text{C}$  and  $P= 1 \text{ atm}$  has volume  $V= 67,2 \text{ L}$ , contains:  
 A About 3 Moles  
 B About 3 Grams  
 C About 3 Molecules  
 D About 1 Mole  
 E About 1 Gram
- 42 In order to neutralize 100 mL of a 0,001M solution of KOH it is necessary to add:  
 A 0.01 mL of  $\text{H}_2\text{O}$   
 B 0.01 mL of a 1 M solution of NaOH  
 C 0,01 mL of a  $10^{-2}$  M solution of  $\text{HNO}_3$   
 D 10 mL of a  $10^{-2}$  M solution of  $\text{HNO}_3$   
 E 10 mL of a  $10^{-2}$  M solution of NaOH
- 43 What is the reaction occurring during metal corrosion?  
 A Hydrolysis  
 B Precipitation  
 C Combustion  
 D Neutralization  
 E Redox

- 44** If 1 g of ammonium chloride is dissolved into water, and the solution is diluted to 10mL with water, the concentration of the solution is:
- A 1000 g/L
  - B 100 g/L
  - C 10 g/L
  - D 1 g/L
  - E 0.1 g/L
- 45** If the pH of a solution varies from 7 to 9, the concentration of  $\text{H}_3\text{O}^+$  ions:
- A Becomes The Half
  - B Becomes The Double
  - C Increases Of 100 Times
  - D Decreases Of 100 Times
  - E Increases Of 2 Units
- 46** What is the International Air Transport Association airport code for Heathrow Airport?
- A HRW
  - B HTR
  - C LHR
  - D LHW
  - E LHT
- 47** Who plays Lara Croft in the Tomb Raider series of films?
- A Angelina Jolie
  - B Minnie Driver
  - C Nell McAndrew
  - D Jennifer Aniston
  - E Pamela Anderson
- 48** Which volcano is best known for its eruption in AD 79 that led to the destruction of the Roman cities of Pompeii and Herculaneum?
- A Mount Etna
  - B Mount Stromboli
  - C Mount Vesuvius
  - D Mount Vulture
  - E Mount Sinai
- 49** Eritrea, which became the 182nd member of the UN in 1993, is in the continent of
- A Asia
  - B Africa
  - C Europe
  - D Australia
  - E America
- 50** For which of the following disciplines is Nobel Prize awarded?
- A Physics and Chemistry
  - B Physiology or Medicine
  - C Literature, Peace and Economics
  - D All of the above
  - E None of the above
- 51** "Run Lola Run" (1998) is a...
- A French movie
  - B German movie
  - C Swedish movie
  - D Italian movie
  - E None of the above
- 52** The Capital of Poland is...
- A Cracow
  - B Paris
  - C Glasgow
  - D Warsaw
  - E Madrid
- 53** What is the Highest Mountain in Western Europe?
- A Ben Nevis - Scotland
  - B Snowden - Wales
  - C Mont Blanc - France/Italy
  - D Gerlach – Slovakia
  - E Sierra Nevada – Spain
- 54** When was European Economic Community formed?
- A 25 March 1957
  - B 10 May 1945
  - C 23 August 1949
  - D 30 December 1955
  - E None of the above

- 55**      **When did Bulgaria and Romania join European Union?**  
A        2001  
B        2007  
C        1993  
D        1996  
E        None of the above
- 56**      **When did euro coins and notes come into circulation?**  
A        1 January 2002  
B        1 June 1998  
C        1 July 2003  
D        7 December 1999  
E        1 January 2000
- 57**      **When was Abraham Lincoln first sworn in as President of USA?**  
A        January 1869  
B        4 March 1861  
C        January 1873  
D        4 March 1849  
E        January 1900
- 58**      **Which river flows through the city of Amsterdam?**  
A        The Tiber  
B        The Tagus  
C        The Amstel  
D        The Thames  
E        None of the above
- 59**      **What is the largest denomination of Euro bank note?**  
A        €100  
B        €500  
C        €200  
D        €1000  
E        None of the above
- 60**      **The reactor at the site of the Chernobyl nuclear disaster is now in which country?**  
A        Poland  
B        Ukraine  
C        Slovakia  
D        Hungary  
E        Russia