DEFENCE SERVICES MEDICAL ACADEMY

MILITARY MEDICAL ADMISSION TEST (MMAT)

PAPER (1) ENGLISH

Date: 00-00-0000 **Time Allowed: (2) Hours**

WRITE YOUR ANSWERS IN THE SPACES PROVIDED IN THIS QUESTION PAPER.

ANSWER ALL QUESTIONS.

I. Read the passage. (20 marks)

There are three main types of light bulb for lighting a room: incandescent, fluorescent and, more recently, the light emitting diode (LED) bulb. All three bulbs have their advantages and disadvantages when it comes to purchase price, running costs and environmental impact.

The traditional incandescent bulb has been in use for more than 100 years. It is made by suspending a fine coil of tungsten wire between two electrodes. When a current flows through the wire it reaches a temperature of more than 2,000° C and glows white hot. The bulb is filled with argon, an inert gas, to prevent the wire from evaporating. Traditional light bulbs are not very efficient, converting less than 10% of the energy into light with the rest as heat, making them too hot to handle. Most household light bulbs are rated at 40, 60 or 100 Watts.

Mass production of fluorescent lights began in the 1940s. The standard size is 1.2 m in length and 2.5 cm in diameter. The tube contains a small amount of mercury and the inside surface of the glass has a phosphor coating. There are two electrodes, one at each end of the tube, but there is no wire in between. Instead, mercury atoms absorb the electrical energy and emit ultraviolet (UV); this light is invisible until it hits the phosphor coating on the glass, which emits a visible white light. Fluorescent lights are about five times more efficient than incandescent light bulbs. A 20-Watt fluorescent tube will produce a similar amount of light to a 100-Watt bulb and runs much cooler, which helps to give it 10 times the life expectancy of a bulb.

The bright light produced by standard fluorescent lights makes them an ideal choice for offices and factories, rather than homes, where the incandescent bulb has traditionally reigned supreme. However, the newer compact fluorescent lamps (CFLs) look likely to make the old bulbs extinct. Global warming is the main reason. Compared with an incandescent bulb, a signal energy-saving fluorescent lamp will save about one-tonne of carbon-dioxide emissions over its lifetime, as well as reduce the consumer's electricity costs.

Not everybody likes the new CFLs, which have the following disadvantages: they are ten times the price of the traditional bulbs; flickering can occur with dimmer switches; they need to warm up to give full brightness; and they emit a bluish, less natural light that can strain the eye. Traditional bulbs are safer to dispose of because they are free from mercury, which is a neurotoxin. The mercury is safe

inside a sealed CFL but it is released into the atmosphere if the bulb is broken. Mercury can accumulate in the body to attack the brain and central nervous system.

The reduced carbon footprint of CFLs in comparison with traditional bulbs may have been overstated. Whilst it is true that traditional bulbs convert 90% of the electricity into heat instead of light, this heat is not wasted. The bulb helps to keep the house warm so less fuel is burnt; for example, less gas or oil. If you change all your bulbs to CFLs it could prove very expensive in the short term and save less energy than you might imagine if your home is properly insulated or you live in a cold climate. If you live in a warm climate, then changing to CFLs will reduce your carbon footprint and the cost of your electricity bills, but the savings will be less than you might expect if the daylight hours are long and the nights are short.

CFLs are themselves under threat from the latest generation of light emitting diodes (LEDs). The LED has been in existence since the 1920s but they have only recently been made bright enough for room lighting. The most common applications to date have been traffic lights, solar garden lights and car brake lights; infrared LEDs are used in television remote controls. LEDs are electronic components that emit photons of light when the current is switched on. Lights for the home are made by clustering several LEDs into a single bulb.

Though more expensive than CFLs, LEDs last up to six times longer and are twice as efficient, producing the same amount of light from half the electrical power (half the carbon emissions). Other advantages of LED lighting include: an 'instant on', meaning that there is no warm-up time; no problems with frequent on/off switching, which shortens the life of fluorescent lights; no glass to break because the LED is made from a hard transparent plastic; and they are free from toxic mercury.

I. (A) If the following statements agree with the information given in the Reading Passage, write **TRUE**, if contradict, **FALSE**, and if there is no information on this, **NOT GIVEN**.

(1) Incandescent bulbs convert more energy to heat than light. (1) …….

(2) Ultraviolet light (UV) can be seen with the naked eye. (2) …….

(3) Compact fluorescent lamps (CFLs) last about 10 years. (3) …….

(4) Fluorescent tubes are the best lights for workplaces. (4) …….

(5) Incandescent bulbs contain mercury. (5) …….

I. (B) Complete the summary below. Choose **NO MORE THAN TWO WORDS** from the passage for each answer.

Switching to CFLs may not be such a bright idea

Whilst it is true that compact fluorescent lamps (CFLs) have a smaller (6) …… than incandescent lighting, bulbs help to (7) …… the house, reducing the amount of gas or oil burnt. Consequently, the savings are less than expected in well (8) …… houses and in (9) …… regions. Fluorescent bulbs contain (10) ……, which is hazardous to health. The new light

emitting diode (LED) bulbs carry no such risk and though expensive, they are more efficient than CFLs.

(6) …… (7) …… (8) ……

(9) …… (10) …….....

II. Complete the sentences with the appropriate words. The initial letters are given. (10 marks)

(1) "Manners" indicates that the way a person **b**……. in society. (1) …….

(2) People who are **c**……. are in peace of mind. (2) …….

(3) Eating more fruits, vegetables and grains, and consuming less food high in fat, sugar and cholesterol make us have a **b**……. of diet to stay healthy. (3) ……..

(4) The crime appears to have been **m**……. by hatred. (4) …….

(5) If you have **g**……. finger, you can grow plants well. (5) …….

(6) It is the school as an institution that **i**……. good manners. (6) …….

(7) To live **c**……., a person needs money some extent. (7) …….

(8) It's impossible to know in **a**……. what will happen. (8) …….

(9) All men in the world are seeking happiness and life **s**……. (9) …….

(10) To be **t**……., basically, you must be honest. (10) …….

III. (A) Choose the appropriate words or phrases to complete the sentences. (10 marks)

(1) Good manners are ……. in life.

(A) having well (B) getting on well (C) got well with

(2) Everybody want to be happy and ……. in life.

(A) relaxed (B) easy (C) cheerful

(3) Just as plants obtain nutrients from the soil ……. they grow.

(A) by which (B) in which (C) from which

(4) The early life struggles of famous writers are really ……. to me.

(A) fascinated (B) fascinating (C) fascination

(5) Don't debate me about it. The rules are ……., and you broke them.

(A) black and blue (B) blue black (C) black and white

(1) …….. (2) …….. (3) ……..

(4) …….. (5) ……..

III. (B) Answer the questions in complete sentences. (15 marks)

(6) What is the difference between "manner" and "manners"?

……..

……..

(7) How do you feel when you are in a peaceful state of mind?

……..

……..

(8) Why should we avoid eating processed foods?

……..

……..

(9) What are the two main types of emotions?

……..

……..

(10) What do these lines means?

"Happy the man, whose wish and care

A few paternal acres bound"

……..

……..

IV. Rewrite the sentences according to the instructions given in brackets. (20 marks)

(1) He has done his homework since 6p.m in the evening. (Use 'It is/It was …who/that…')

……..

……..

(2) I read a good novel yesterday. I wrote a love poem yesterday. (Join the sentences, using "not only …… but also".)

……..

……..

(3) It was such a dark night that there were very few people in the street. (Rewrite the sentence using 'so …. That')

……..

……..

(4) I know the boy. His money was stolen yesterday. (Join the sentences using "whose")

……..

……..

(5) The man said to U Po, "Why didn't you tell the truth at the trail?" (Change the sentence into the reported speech.)

……..

……..

(6) All the schools in Myanmar hold the School Family Day in December every year. (Change the sentence into the passive voice.)

……..

……..

(7) The Omar Ali Saifuddin Mosque is one of the attractive mosques in Asia. (Rewrite the sentence by using the suitable forms of degrees)

……..

……..

(8) Hla Maung took my book but he didn't ask for my permission. (Join the sentences, using 'without + V –ing'.)

……..

……..

(9) The police must search everyone on the bus if they want to find the pickpocket. (Rewrite the sentence by using 'Unless'.)

……..

……..

(10) The detective examines the crime scene. He is not searching for clues. (Join the sentences, using 'as if/ as though'.)

……..

……..

V. Write about the following topic using at least 250 words. (25 marks)

"Most of the people think that the study of medicine is more difficult than others."

To what extent do you agree or disagree with this statement.

(Use the blank paper for your answer.)

DEFENCE SERVICES MEDICAL ACADEMY

MILITARY MEDICAL ADMISSION TEST (MMAT)

PAPER (2) BIOLOGY & CHEMISTRY

Date: 00-00-0000 **Time Allowed: (2) Hours**

WRITE YOUR ANSWERS IN THE SPACES PROVIDED IN THIS QUESTION PAPER.

ANSWER ALL QUESTIONS

SECTION A - BIOLOGY

I. State TRUE or FALSE to the following statements. (16 marks)

(1) Food is one of the major requirements of life. (1) .....

(2) DNA polymerase replicates the two original strands differently. (2) .....

(3) Most transpiration takes place through the stomata. (3) .....

(4) Glucose can be moved through the xylem as part of the sucrose molecule. (4) .....

(5) The open circulatory system is found in most arthropods. (5) .....

(6) Signs of plant disease are physiological evidence of the pathogen. (6) .....

(7) Spider silk is referred to by many scientists as bio-steel. (7) .....

(8) The two strands of a DNA molecules are parallel. (8) .....

(9) Platelets are tiny fragments of large cells called megakaryocytes. (9) .....

(10) Bacteria are most active in warm and humid environments. (10) .....

(11) Commercially cultivating agricultural crops in Myanmar are mainly cereals, pulses and oilseed crops. (11) .....

(12) The study of chemical, physical structures and functions of biological microorganisms is known as molecular biology. (12) .....

(13) Oxygen is supplied to the heart muscle by the coronary arteries. (13) .....

(14) The narrowed coronary arteries supply enough oxygenated blood and the heart muscle resorts to anaerobic respiration. (14) .....

(15) Overhunting threatens one-third of endangered vertebrates. (15) .....

(16) Plant disease is any abnormal condition that alters the appearance or function of a plant. (16) .....

II. Complete the following statements with appropriate words. (16 Marks)

(1) Plasma is the ..... part of the blood.

(2) Drought stress or ..... injury will likely cause damage on several types of plants.

(3) The skull forms a protective bony ..... around the brain.

(4) The dissolved mineral ions are transported in the ..... tissue.

(5) Most cardiovascular disease starts with …… formation.

(6) Habitat destruction has played a key role in …… .

(7) The major arteries close to the heart must withstand …… surges.

(8) A change in the environment which can be detected by the body is called …… .

(9) The two steps in …… synthesis are transcription and translation.

(10) Nematodes are very tiny …… .

(11) The forebrain comprises the ……., thalamus and hypothalamus in the brain.

(12) A variety of human activities threatens the …… of Myanmar.

(13) Hydrogen bonds link each complementary …… pair.

(14) Gibberellins are …… hormones that include gibberellic acid.

(15) Horticulture is a branch of …… .

(16) The milk of female transgenic offspring contains …… growth protein.

III. Choose the correct answer for the following statements. (16 marks)

(1) The cell is a basic unit structure and (A. loading, B. tasking, C. function, D. making) of an organism. (1) ……

(2) The smallest branches of the arterial system furthest from the heart is (A. capillaries, B. venules, C. arterioles, D. vessels). (2) ……

(3) Between the capillaries and the cells is a watery liquid called (A. tissue, B. cell, C. blood, D. plasmic) fluid. (3) ……

(4) In tuberculosis, the bacteria usually attack (A. heart, B. tumour, C. kidneys, D. lungs). (4) ……

(5) (A. Oestrogen, B. Testosterone, C. Progesterone, D. Prolactin) promotes the development of female secondary sexual characteristics. (5) ……

(6) Oxygen is supplied to the heart muscle by the (A. pulmonary artery, B. pulmonary vein, C. coronary artery, D. coronary vein). (6) ……

(7) A body mass index of (A. 12.5-18, B. 18.5-25, C. 25-32.5, D. 32-48.5) kg m^{-2} is an ideal range of a healthy weight. (7) ……

(8) Growth is considered as an increase in the (A. weight, B. size, C. height, D. mass) of the object. (8) ……

(9) (A. Amino acids, B. nucleotides, C. Polysaccharides, D. Peptides) are repeatedly joined together to form DNA strands. (9) ……

(10) The contractions of the heart are called (A. stroke, B. systole, C. diastole, D. stress). (10) ……

(11) The endocrine glands secrete hormones directly into the (A. organs, B. nerves, C. cells, D. bloodstreams). (11) .....

(12) The best way to conserve any species is to keep it in its (A. particular habitat, B. unusual habitat, C. artificial habitat, D. natural habitat). (12) .....

(13) The source of quinine is (A. willow tree, B. cinchona tree, C. foxglove plant, D. opium poppy). (13) .....

(14) In total, there are around (A. 3.1, B. 3.2, C. 3.3, D. 3.4) billion base pairs in the DNA of a typical mammalian cell. (14) .....

(15) One of the most common vectors of viruses are (A. water, B. air, C. insects, D. animals). (15) .....

(16) The myelin sheath supplies nutrients to (A. axons, B. neurons, C. dendrons, D. dendrites). (16) .....

IV. Write the letter of the correct match from Column B next to the number in Column A. (6 Marks)

Match items in column A and B.

Column A	**Column B**
(i) Diet and obesity	A. Heart attack
(ii) Diseases	B. Prophylactic drug for malaria
(iii) Signs	C. Result of disturbance in the normal life process
(iv) Myocardial infarction	D. Modifiable risk factors for cardiovascular disease
(v) Malaria	E. Physical evidence of the pathogen
(vi) Proguanil	F. Disease caused by *Plasmodium*

(i) ..... (ii) ..... (iii) .....

(iv) ..... (v) ..... (vi) .....

V. Read the following passages and fill in the blanks with the appropriate words. Use words from the list provided. Each word may be used once, more than once, or not at all. (6 Marks)

Complete this paragraph about the replication of DNA.

semiconservative	Watson	replication	bonds
copy	Meselson	molecules	compounds

DNA ----(a)------- is the making of an exact -----(b)----- of the DNA molecule. The replication is made by a -----(c)------ method, which was predicted by ------(d)---- and Crick and proven

by -------(e)----- and Stahl. It is regarded as semiconservative because each of the resulting two -------(f)----- consists of one old strand and one new strand.

(a) …… (b) …… (c) ……

(d) …… (e) …… (f) ……

VI. Answer ALL questions. (10 Marks)

(1) State briefly on the recombinant DNA method.

……

……

……

……

(2) Name the type of immunity provided by vaccination and give one example of a common vaccine.

……

……

……

……

(3) Where in a human cell are genes located, and why is this important in medicine?

……

……

……

……

(4) Name two non-communicable diseases that are common in adults.

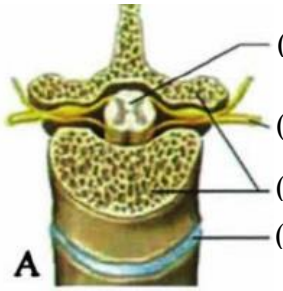
……

……

……

……

(5) Give the labels and caption of the following diagram.



(1) ……..

(2) ……..

(3) ……..

(4) ……..

Caption ……

SECTION B – CHEMISTRY

I. State TRUE or FALSE to the following statements. (8 marks)

(1) The elements with low electron affinity easily gain electrons, resulting in the formation of anions. (1) ……

(2) The heat absorbed or released in a process occurring at constant pressure is called the enthalpy change. (2) ……

(3) Ethanoic acid is manufactured by the fermentation of ethanol. (3) ……

(4) A rate is always expressed a s appositive quantity. (4) ……

(5) Tobacco smoking is not also a significant source of cadmium exposure. (5) ……

(6) Respiration is the process of gas exchange between the atmosphere and living organisms. (6) ……

(7) The main component of nail polish remover is carboxylic acid. (7) ……

(8) Most of the Earth's carbon is stored in rocks and sediments. (8) ……

II. Complete the following statements with appropriate words. (8 Marks)

(1) Most chemical reactions react …… at a high temperature than at a low temperature.

(2) Cadmium exists as the …… oxidation state in nature.

(3) At ……., the rates of forward and reverse reactions are equal.

(4) Autoionisation of water is reaction between two water molecules yielding …… and hydroxide ions.

(5) One cubic centimetre (1 cm^3) cube of iron is ……. times heavier than a 1 cm^3 cube of sodium.

(6) The combustion of fossil fuels and organic materials gives off carbon dioxide, water and …… .

(7) Spectroscopy is the study of the interaction of matter and ……. radiation.

(8) A radiotracer is a radioactive ……. used to study the dynamic behaviour of various chemical and biological changes in a system.

III. Choose the correct answer for the following statements. (8 marks)

(1) In the HCl molecule, there are …… unshared pair electrons in the Cl atom.
(A. two, B. three, C. four, D. six) (1) ……

(2) Digestive enzymes, such as ……... are present in saliva. (A. pepsin, B. ptyalin, C. protein, D. diastase) (2) ……

(3) Which of the following factors do you think will not affect the state of the equilibrium? (A. concentration, B. pressure, C. temperature, D. colour) (3) .....

(4) Which of the followings is the strongest conjugate base? (A. Cl^-, B. SO_4^{2-}, C. $CH3COO^-$, D. NO_3^-) (4) .....

(5) $(NH_4)_2SO_4$ is the salt of the weak base and the strong acid. So, the salt solution is ..... . (A. acidic, B. basic, C. neutral, D. alkaline) (5) .....

(6) ..... ion has brilliant blue colour used as paint, ink and pigments. (A. Iron, B. Nickel, C. Manganese, D. Cobalt) (6) .....

(7) (A. Dalton's, B. VSEPR, C. Bohr's Atomic, D. Lewis Bonding) Theory is utilized in predicting molecular shapes. (7) .....

(8) ..... are used in making azo-dyes and nylon apart from medicines and drugs. (A. Esters, B. Aldehydes, C. Amines, D. Ketones) (8) .....

IV. **Answer ALL questions. (6 Marks)**

(1) What is the thermometer? Briefly describe about it.

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(2) What is the normal pH of human blood? Why is maintaining this pH important?

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.....

(3) Name two electrolytes commonly measured in blood tests and state why they are important in medicine.

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