

DEFENCE SERVICES ACADEMY
2026-2027 ENTRANCE EXAMINATION
ENGLISH TEST
SAMPLE QUESTION

Time Allowed: 2 Hours

ANSWER ALL QUESTIONS.

I. Read the passage.

The 21st Century World has become a more diverse community as a result of rapid changes in the global economy, technology and transportation. There has been more contact among people who are from different religious, social, ethnic and education backgrounds. Therefore, intercultural communication plays an important role in diverse cultural contexts. Intercultural communication is a discipline that studies communication across different cultures and social groups, or how culture affects communication. When we deal with people from different cultures, intercultural conflicts and misunderstandings may arise from differences in cultural values and traditional practices.

Under the Japan Exchange and Teaching (JET) Programme, Megan, an Australian teacher, was excited to have challenging experiences in Japan. After delivering her first lecture, she asked her Japanese colleagues for some suggestions on her lecture, “Did it work?”, “Did the activity go well?” She didn’t receive any negative comments – no one said ‘no’ to her directly. Now she has been in Japan for two months and she hasn’t heard the word ‘iee’ (no). What an exciting experience for her!

(A) Write the correct word or words to complete each sentence. (5 marks)

1. The global economy, technology and transportation have changed sothat the 21st Century World has become more diverse.
2. Along with the said changes, people from different backgrounds have toeach other.
3.in cultural contexts needs to be considered when studying intercultural communication.
4.with people from different cultures may lead to intercultural conflicts and misunderstandings.
5. Megan’s..... were asked for some suggestions on her lecture.

(B) Answer each question in one sentence. (10 marks)

6. What has happened to the world due to rapid changes in the global economy, technology, and transportation?
7. In intercultural communication, what else should we study besides communication across different cultures?
8. Why may intercultural conflicts and misunderstandings arise when communicating with people from different cultures?
9. How did Megan feel during her time in the Japan Exchange and Teaching (JET) Programme?
10. What kind of feedback did Megan receive after her first lecture and why?

II. Choose the appropriate words or phrases to complete the sentences. (20 marks)

1. Smoking is strictly _____ in the public areas of Japan.
(A) prohibited (B) prohibiting (C) prohibit
2. To be a good citizen, one should be _____ of their responsibilities.
(A) fully aware (B) highly recommend (C) absolutely necessary
3. She thinks the CEO will _____ her proposal.
(A) knock back (B) knock down (C) knock off
4. She speaks Japanese as if shea native speaker.
(A) is (B) was (C) were
5. When the teacher entered the classroom, she _____ there was none of the students.
(A) found (B) will find (C) would find
6. He acted as if he _____ from a big city.
(A) had come (B) has come (C) came
7. Students should know the difference between sleep deprivation and _____.
(A) sleep disorder (B) insomnia (C) sleeping pills
8. ‘Schatz’ is a German term for _____, used as a loving nickname.
(A) hatred (B) loathe (C) affection
9. It takes hard work and determination to _____ your goals in life.
(A) accomplish (B) abandon (C) confuse

10. He saw her _____ of the conference hall.
 (A) going out (B) went out (C) go out

III. Rewrite the sentence according to the instructions given in brackets. (20 marks)

- Her diplomatic skills are not tactful enough to solve this Gordian knot. (Use 'too...to')
- He continued with his plan. All his friends advised him to abandon it. (Join, using ' appropriate subordinating conjunction')
- The thief who had been caught red-handed by the police was taken into custody immediately. (Omit the relative pronoun)
- Someone cannot be judged by his or her appearance. (Change into active voice)
- Tight clothing can constrict blood flow. It can also lead to discomfort and potential health issues. (Use ' Participle phrase')
- Speech to be delivered by the President of the Company had been translated into English. Then, it was proofread by the Chief Executive Officer. (Use 'After + V-ing')
- A conflict should be handled through negotiation. (Use 'It is / was.....who / that...')
- She will eat up whatever food her mother cooks. (Use 'No matter')
- Fossil fuels run out quickly as we did not develop alternative sources earlier. (Use 'third conditional')
- The candidates surfed the internet. They wanted to gather more information for their assignment. (Use 'so that')

IV. Answer the questions in complete sentences. (30 marks)

- To build a well-mannered society, what should the elders of the present generation do to the juniors?
- What will happen to your body and mind when you practice meditation?
- Why are forests said to an excellent source of foods? What will the human world suffer from if national institutions and local communities fail to protect the environments around them?
- The ten practical ways contributing to our emotional well-being were suggested by the well-known psychologist Dr Hal Baumchen. Mention three practical ways to achieve emotional well-being.
- What do the colours of a national flag represent?
- In what sectors are AI-powered machines reportedly outperforming humans?
- How do you understand by the terms: diurnal, nocturnal, and crepuscular?
- What are the drawbacks of using hydropower?
- What excited Annie Sullivan and what did she find when she arrived at the Kellers' house?
- Why does the person in a higher position need more expertise?
- Give the meanings of the color-related expressions 'greenhorn' and 'green grocer'.
- What medicines did the doctor give him to the boy and what is the name of the book the father was reading to his son?
- What are the nonverbal features that can express the personality of a person?
- What is the function of the ozone layer and how does water pollution occur?
- What will happen to you if you are envious of someone?

V. Write an essay on ONE of the following. Do not write more than 500 words. (15 marks)

The benefits of forests to humans

(OR)

The importance of good manners in a job interview

(OR)

Public transportation is better than private transportation

**DEFENCE SERVICES ACADEMY
ENTRANCE EXAMINATION
MATHEMATICS**

Date: - -

Time Allowed: 2 Hours

ANSWER ALL QUESTIONS

PART (A)

1. Choose the correct or the most appropriate answer for each question. Write the letter of the correct or the most appropriate answer. **(20 marks)**

(1) If $x^2 + 2x + 3 = 0$, then $x =$

- A. $1 \pm \sqrt{2}i$ B. $-1 \pm \sqrt{2}i$ C. $1 + \sqrt{2}i$ D. $\pm \sqrt{2}i$ E. $1 - \sqrt{2}i$

- (2) The distance from the point $(3, 7, -5)$ to the y-axis is

- A. $\sqrt{58}$ B. $\sqrt{74}$ C. $\sqrt{24}$ D. $\sqrt{34}$ E. $\sqrt{43}$

(3) If $\vec{a} = \begin{pmatrix} -1 \\ 2 \\ u \end{pmatrix}$ is parallel to $\vec{b} = \begin{pmatrix} v \\ -2 \\ 1 \end{pmatrix}$, then $u - v$ is

- A. -2 B. -1 C. 0 D. 1 E. 2

(4) ${}^{10}P_5 + {}^{10}P_0 =$

- A. 30240 B. 5040 C. 30239 D. 5041 E. 30241

- (5) The radius of the circle $x^2 + y^2 - 2x + 10y + 23 = 0$ is

- A. 3 B. $\sqrt{3}$ C. $\sqrt{2}$ D. 2 E. 1

(6) $\sin \left(\cos^{-1} \frac{\sqrt{3}}{2} \right) =$

- A. $\frac{1}{2}$ B. $\frac{\sqrt{3}}{2}$ C. $\frac{\sqrt{3}}{3}$ D. $\sqrt{3}$ E. 1

- (7) Differentiate the function $e^{\sin x}$ with respect to x is

- A. $e^{\sin x} \sin x$ B. $e^{\cos x} \sin x$ C. $e^{\sin x} \cos x$ D. $e^{\cos x} \cos x$ E. $e^{\sin x \cos x}$

- (8) The gradient of the normal to the curve $y = x^2 + kx + 7$ at the point $(-2, 1)$ is $-\frac{1}{2}$, then $k =$

- A. 3 B. 4 C. 5 D. 6 E. 7

(9) If $\int \frac{15x^4 - 2x}{x^2} dx = ax^3 + b \ln|x| + C$, where a and b are integers, then $a + b$ is

- A. -2 B. 2 C. 3 D. 7 E. 5

(10) If $\int_0^{\frac{\pi}{2}} \sin \theta d\theta$ is equal to

- A. $\frac{\pi}{2}$ B. $-\frac{\pi}{2}$ C. 0 D. -1 E. 1

PART (B)

- 2.(a) Find the cube roots of a complex number $z = i$. **(8 marks)**
- (b) Use the mathematical induction principle to prove that $3^n - 1$ is divisible by 2 for all natural number n . **(8 marks)**
- 3.(a) Find the equation of the line passing through the point $(8, -1, -10)$ and perpendicular to the line $(x, y, z) = (1 + 2k, 2 - k, 3 - 7k)$. Find also the point of intersection of two lines. **(8 marks)**
- (b) The points $A(2, -1, 4)$, $B(5, 1, 2)$ and $C(3, 1, 4)$ are vertices of a parallelogram ABCD. **(8 marks)**
- (i) Find the coordinates of D.
- (ii) Calculate the area of the parallelogram.
- 4.(a) A registration code consists of two of 12 different capital letter A, B, C, ..., L, followed by one of the ten digits 0, 1, 2, ..., 9, for example ID5. How many codes are possible to generate: **(8 marks)**
- (i) If the repetition of the letters is allowed?
- (ii) If the repetition of the letters is not allowed?
- (iii) If two letters in the codes must be same?
- (iv) If two letters are different, but must be both vowels or both consonants?
- (b) Determine the equation of the parabola, whose axis of symmetry is the line $y = 1$, passing through the points $(1, 3)$ and $(-2, -3)$. **(8 marks)**
- 5.(a) Differentiate $y = \sin x$ with respect to x from the first principles. **(8 marks)**
- (b) Given that $y = e^{3x} \sin 2x$, prove that $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 13y = 0$. **(8 marks)**
- 6.(a) Evaluate each of the following integrals: **(8 marks)**
- (i) $\int (4x^5 + 1) dx$ (ii) $\int (e^x + 2\sin x) dx$
- (iii) $\int \sin 5x \sin 2x dx$ (iv) $\int xe^{x^2} dx$.
- (b) Find the exact value of $\int_0^{\pi} x \sin^2 x dx$. **(8 marks)**

DEFENCE SERVICES TECHNOLOGICAL ACADEMY
ENTRANCE EXAMINATION
ENGLISH

Date: - -

Time Allowed: 2 hours

ANSWER ALL QUESTIONS

I. Read the passage.

A robot is a machine, but it is not just any machine. It is a **special** kind of machine. It is a machine that moves. It follows instructions. The instructions come from a computer. Because it is a machine, it does not make mistakes. And it does not **get tired**. And it never complains. Unless you tell it to! Robots are all around us. Some robots are used to make things. For example, robots can help make cars. Some robots are used to explore dangerous places. For example, robots can help explore volcanoes. Some robots are used to clean things. These robots can help vacuum your house. Some robots can even recognize words. They can be used to help answer telephone calls. Some robots look like humans, but most robots do not. Most robots just look like machines.

Long ago, people imagined robots. Over 2,000 years ago, a famous poet imagined robots. The poet's name was Homer. His robots were made of gold. They cleaned things and they made things. But they were not real. They were **imaginary**. Nobody was able to make a real robot. The first real robot was made in 1961. It was called Unimate. It was used to help make cars. It looked like a **giant** arm. In the future, we will have even more robots. They will do things that we can't do. Or they will do things that we don't want to do. Or they will do things that are too **dangerous** for us. Robots will help us fight fires. They will help us fight wars. They will help us fight sickness. They will help us discover things. They will help make life better.

(A) Find the bold-faced words in the passage that are similar in meaning to the following. (5 marks)

- (1) fictional =
- (2) different from normal =
- (3) risky =
- (4) fatigued =
- (5) colossal =

(B) Answer the following questions. Give complete answers. (10 marks)

- (1) What kind of machine is a robot?
- (2) In which places can robots be used?
- (3) When was the imaginary robot introduced?
- (4) For what purpose was the first real robot made?
- (5) How can future robots help to make life better?

II. Complete the sentences with the appropriate words. The initial letters are given. (30 marks)

- (1) Instead of saying 'we feel sad and lonely', we can say 'we feel **b**_____.'
- (2) If you have **g**_____ finger, you can grow plants well.
- (3) A **g**_____ is a person who sells fruit and vegetables.
- (4) If a footballer is shown a red card, he is sent off the **p**_____.
- (5) If someone is yellow, he or she has no **c**_____.
- (6) If you are the black sheep of the family, you stand **n**_____ out from the rest of the family.
- (7) It is illegal to buy and sell things in black **m**_____.
- (8) Tun Tun passed the exam with flying **c**_____ as he studied hard the whole year round.
- (9) It is difficult to differentiate whether a man is telling the truth or telling a **w**_____ lie when he says 'I love you' to a woman.
- (10) As he could pay back all his debt, he is now out of the **r**_____.
- (11) In the classroom, teachers are good role **m**_____ different types of students.
- (12) **C**_____ often influences teenagers and young adults.
- (13) The **m**_____ of society is a difficult task.
- (14) Most adults do not believe that bad manners of teenagers against them are **d**_____ handled.
- (15) There should be a **m**_____ responsibility between the adults and the youth to build a well-mannered society.

III. Rewrite the sentences according to the instructions given in brackets.

(20 marks)

- (1) Bagan is the most famous ancient city in Myanmar. We will visit there next summer. (Join the sentences, using 'noun in apposition'.)
- (2) They did not have enough food to eat. They did not have money to go to a restaurant. (Join the sentences, using 'neither _____ nor'.)
- (3) Hnin Hnin said to me, "What were you doing when I phoned you this morning?" (Change the sentence into the reported speech.)
- (4) Did the child pick up the toys on the floor and put them into a drawer? (Change the sentence into the passive voice.)
- (5) No sooner did I finish writing my essay then I heard the bell ring. (Change the sentence, beginning with 'As soon as _____'.)
- (6) A police officer stopped and arrested the robbers. His car was parked at the next corner. (Join the sentences, using appropriate pronoun/ relative adverb.)
- (7) Thuzar feels very sorry for what happened. The damage has been done and there is no way to reverse it. (Join the sentences, using 'no matter _____'.)
- (8) He did not practice enough, and as a result, he did not improve his skill. (Use the third conditional.)
- (9) Idioms are challenging for learners of English. Phrasal verbs can make English seem more difficult than it actually is. (Join the sentences, using 'not only _____ but also'.)
- (10) How worked very hard. He completed the project on time. (Join the sentences, using 'enough to'.)

IV. Complete the dialogue with expressing given below. There is an extra.

(10 marks)

it is yellow

Is it made from lemons

are yellow

What do you

What are you drinking

What colour are

- (1) A: _____ chicks?
B: Chicks are yellow.
- (2) A: What colour is that thing inside a boiled egg?
B: That thing is a yolk, and _____.
- (3) A: _____?
B: I am drinking lemonade.
- (4) A: What is lemonade made from?
B: _____.
- (5) A: What colour are lemons?
B: They _____.

V. Choose a situation given below and write a letter. Do not write more than 300 words.

(10 marks)

You are **Kyaw Kyaw**. You live at **No.107, San Pya Road, Yangon**. Write a letter to your friend, **Zaw Zaw**, telling him about the importance of computer skills in learning a foreign language and inviting him to attend the computer course you have plan to join.

(OR)

You are **Aung Aung**. You live at **No.10, Pagoda Road, Pyin Oo Lwin**. Write a letter to a friend **Min Min**, thanking them for a gift they gave you. Mention how you plan to use it and why it's special to you.

VI. Write an essay on ONE of the following. Do not write more than 500 words.

(15 marks)

- The Importance of Learning a Foreign Language
- Opportunities and Challenges Faced by Students
- Tourist Attractions in Myanmar

DEFENCE SERVICES TECHNOLOGICAL ACADEMY
ENTRANCE EXAMINATION
MATHEMATICS

Date: - -

Time Allowed: 2 hours

Attempt all questions

1. Choose the correct or the most appropriate answers for each question. Write only the letter of answer. (20 marks)

- (1) The trigonometric form of $z = -i$ with $-\pi < \theta \leq \pi$ is
A. $\cos\left(-\frac{\pi}{2}\right) + i\sin\left(-\frac{\pi}{2}\right)$ B. $\cos\frac{\pi}{2} - i\sin\frac{\pi}{2}$ C. $\cos\pi + i\sin\pi$ D. $\cos\pi - i\sin\pi$
- (2) If $z = 1 + \sqrt{3}i$, the value of $\frac{1}{z}$ is
A. $\frac{1+\sqrt{3}i}{4}$ B. $\frac{1-\sqrt{3}i}{4}$ C. $\frac{1+\sqrt{3}i}{-2}$ D. $\frac{1-\sqrt{3}i}{-2}$
- (3) The plane passing through the point (1, 2, 3) and parallel to the plane $x + y + z = 0$ is
A. $x + y + z = 6$ B. $x + y + z + 6 = 0$ C. $x + y + z = 5$ D. $x + 2y + 3z = 0$
- (4) The equation of the plane containing the point (1, -2, -2) and parallel to yz -plane is
A. $x = 1$ B. $y = -2$ C. $z = -3$ D. $y = 0$
- (5) There are four chairs with two chairs in each row. In how many ways can four persons be seated on the chairs, so that no chair remains unoccupied?
A. 6 B. 12 C. 24 D. 48
- (6) If P is (-1, 2, 4) and Q is (-5, 4, 2). Then $\overrightarrow{PQ}$ is
A. $\begin{pmatrix} 4 \\ -2 \\ 2 \end{pmatrix}$ B. $\begin{pmatrix} -4 \\ 2 \\ -2 \end{pmatrix}$ C. $\begin{pmatrix} -4 \\ 2 \\ 2 \end{pmatrix}$ D. $\begin{pmatrix} 4 \\ -2 \\ -2 \end{pmatrix}$
- (7) The center of the circle $(x+2)^2 + y^2 = 9$ is
A. (2, 0) B. (-2, 0) C. (0, -2) D. (0, 2)
- (8) The equation of the circle of radius $\sqrt{2}$ centered at (-2, -3) in standard form is
A. $(x-2)^2 + (y-3)^2 = \sqrt{2}$ B. $(x+2)^2 + (y+3)^2 = \sqrt{2}$ C. $(x-2)^2 + (y-3)^2 = 2$ D. $(x+2)^2 + (y+3)^2 = 2$
- (9) The amplitude of the function $y = -4 \sin\pi(x-1) + 2$ is
A. -2 B. 2 C. -4 D. 4
- (10) The midline of the function $y = 3 \sin 4(x+1) - 2$ is
A. $y = -1$ B. $y = -2$ C. $y = -3$ D. $y = -4$
- (11) The trigonometric function with a period 3π is
A. $\sin\frac{1}{3}x$ B. $\cos 3x$ C. $\tan\frac{1}{3}x$ D. $\cot 3x$
- (12) What is the domain of $y = \ln(x+2)$?
A. $\mathbb{R}$ B. $\{x / x < -2\}$ C. $\{x / x > 2\}$ D. $\{x > -2\}$
- (13) If $f(x) = \log_3 x$ and $g(x)$ is the image of $f(x)$ after a translation of five units to the left, which equation represents $g(x)$?
A. $g(x) = \log_3(x+5)$ B. $g(x) = \log_3 x + 5$ C. $\log_3(x+5)$ D. $g(x) = \log_3 x + 5$
- (14) What is the asymptote of $y = \log_2 |x|$?
A. $y = \mathbb{R}$ B. $x < 0$ C. $x > 0$ D. $x = 0$
- (15) The derivative of $\cos(3x)$ is
A. $\cos(3x)$ B. $3\sin(3x)$ C. $-3\sin(3x)$ D. $-3\cos(3x)$
- (16) If $y = \sin^2(4x)$, then $dy/dx =$
A. $8 \sin(4x) \cos(4x)$ B. $12 \sin^2(4x)$ C. $12 \sin^2(4x) \cos(4x)$ D. $-12 \sin^2(4x) \cos(4x)$
- (17) $\int (2-3x)^5 dx =$
A. $\frac{1}{3}(2-3x)^6 + c$ B. $-\frac{1}{18}(2-3x)^6 + c$ C. $-\frac{1}{2}(2-3x)^6 + c$ D. $\frac{1}{2}(2-3x)^6 + c$
- (18) $\int \sin 7x \cos 2x dx =$
A. $\frac{1}{10} \sin 5x - \frac{1}{18} \sin 9x$ B. $\frac{1}{18} \sin 9x + \frac{1}{10} \sin 5x$ C. $-\frac{1}{18} \cos 9x + \frac{1}{10} \cos 5x$ D. $-\frac{1}{18} \cos 9x - \frac{1}{10} \cos 5x$
- (19) The area of the region bounded by the curve $y = -x^2 + 2x + 8$, between $x = -2$ and $x = 4$ is
A. 36 unit² B. 34 unit² C. 32 unit² D. 30 unit²
- (20) $\int_1^4 (5x^2 - 8x + 5) dx =$
A. 40 B. 50 C. 60 D. 70

2. (a) Find the cube roots of $z = -2 - 2i$. (5 marks)
 (b) Solve $z^6 = 1$. (5 marks)
3. (a) Find the equation of the plane tangent to the sphere $(x + 2)^2 + (y - 1)^2 + (z + 3)^2 = 27$ at the point $(3, 2, -2)$. (5 marks)
 (b) Given points A, B and C with coordinates $(3, -5, 1)$, $(7, 7, 2)$ and $(-1, 1, 3)$. (5 marks)
 (i) Calculate $\vec{p} = \overrightarrow{AB} \times \overrightarrow{AC}$ and $\vec{q} = \overrightarrow{BA} \times \overrightarrow{BC}$.
 (ii) What can you say about vectors $\vec{p}$ and $\vec{q}$?
4. (a) How many permutations are there of the letters of the word PROGRAM if they do not end in? (5 marks)
 (i) 2 R's?
 (ii) MAP?
 (b) If A is a set containing 9 distinct elements. How many subsets of A contain? (5 marks)
 (i) at most 2 elements?
 (ii) at least 3 elements?
5. (a) Find the center and radius of each of the following circles. (5 marks)
 (i) $(x - 3)^2 + (y - 5)^2 = 16$
 (ii) $(x + 7)^2 + (y - 2)^2 = 9$
 (iii) $x^2 + y^2 = 1$
 (iv) $x^2 + (y - 3)^2 = 49$
 (b) Write the given equation $y^2 - 12x - 6y - 3 = 0$ in standard form. Sketch its graph showing the vertex, focus, directrix and end points of latus rectum. (5 marks)
6. Draw the graph of $y = a \tan bx$ and $y = a \cot bx$ for $a, b > 0$. (10 marks)
7. A rectangular box has a square base of side x cm. If the sum of one side of the square and height is 15 cm, express the volume of the box in terms of x . Use this expression to determine the maximum volume of the box. (10 marks)
8. Find $\frac{dy}{dx}$ if $y = \sqrt{(x^2 + 1)(x - 1)^2}$. (10 marks)
9. Find the area between $y = \sin x$ and $y = \cos x$ for $\frac{\pi}{4} \leq x \leq \frac{5\pi}{4}$. (10 marks)

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 similar 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 trial?” (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

- (i) Diet and obesity
- (ii) Diseases
- (iii) Signs
- (iv) Myocardial infarction
- (v) Malaria
- (vi) Proguanil

Column B

- A. Heart attack
- B. Prophylactic drug for malaria
- C. Result of disturbance in the normal life process
- D. Modifiable risk factors for cardiovascular disease
- E. Physical evidence of the pathogen
- 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.

.....

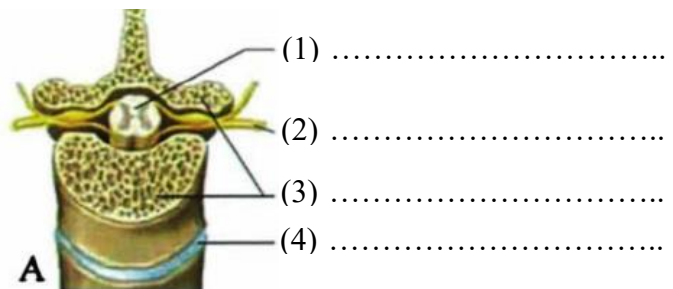
- (3) Where in a human cell are genes located, and why is this important in medicine?

.....

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

.....

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



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 as a positive 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. CH_3COO^- , D. NO_3^-) (4)
- (5) $(\text{NH}_4)_2\text{SO}_4$ 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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