

**DEFENCE SERVICES ACADEMY  
2017-2018 ENTRANCE EXAMINATION  
ENGLISH TEST**

**Time Allowed 2 Hours**

**( Answer all questions. )**

**I. Read the passage.**

My mother and I were dreamers. When the days were soft and tender, we sat on the beach, digging our toes into the hot sand. The big breakers came in slowly; their shoulders growing tall and green. They crashed in thunderous white, and we would sit in silence, the breeze scrubbing the hot sun from our faces.

She was 34; I was 10. She was short, plump, a woman of fair skin and brownish hair. She was feminine and prim. I asked what she dreamed. Jenny Tier Bishop laughed and ruffled my wet hair. "You," she said, "are an inquisitive little boy." "Yes, ma'am," I said. She told me her dream. Someday, when my father had a lot of money, he would buy diamond earrings for her. Not big ones, of course. "See," she said pulling her ears, "these were pierced when I was 15. Wouldn't I look pretty with little diamonds?"

"Yes, ma'am," I said "You sure would."

**(A) Write the correct word or words to complete each sentence. (10 Marks)**

1. Both the boy and his mother enjoyed ..... on the beach.
2. The boy and his mother would ..... their toes into the hot sand on which they sat.
3. The boy and his mother sat without ..... as they watched the breakers.
4. The boy's mother had fair skin and ..... hair.
5. The mother's ears were ..... when she was fifteen.

**(B) Answer each question in one sentence. (10 Marks)**

6. When did the boy and his mother usually go and sit on the beach?
7. How did the big breakers come towards the beach?
8. Why did the mother say that her son was an inquisitive little boy?
9. What was Jenny's dream?
10. What kind of earrings did Jenny expect from her husband?

**II. Fill in each numbered blank with a word from the list given. (20 Marks)**

in	our	about	between	and
both	of	ever	good	at
who	by	known	often	once
try	with	for	were	that

Many stories about war deal ...1... only the brave. Most often we hear ...2... great deeds of men ...3... fear nothing; of giants who turn the tide of battle ...4... a single brave act. But what about stories ...5... people who are really afraid ...6... battle? Has it ...7... happened?

There ...8... a number of time ...9... this occurred in history. Very ...10... the records skip over such actions ...11... go on to something else. Every...12... in a while, however, the facts are made ...13... and we can look at them and ...14... to learn what war is really like.

One ..15... example is the battle ...16... a place called Bull Run, in Virginia. The time was 1861. The reason was the war ...17... the States - often called the Civil War - the war that split ...18... country into Northern and Southern states over the question of slavery and freedom. Many people of ...19... sides had been happy to join the army to fight ...20... what they believed in.

**P.T.O**

**III. Put a, an or the in each blank where necessary. Write down the number and its answer. If no article is needed, write ( x ). ( 10 Marks )**

1. Do you know ..... girl who is standing next to Caroline?
2. The brave soldier lost ..... arm in the battle.
3. The doctor says it is ..... hopeless case.
4. The most famous carnival is celebrated in ..... Brazil.
5. Who wishes to take ..... walk with me?
6. The travel company made us ..... advantageous offer.
7. Get pound of sugar from ..... nearest grocer.
8. May we have ..... pleasure of your company?
9. The Mona Lisa is ..... real masterpiece.
10. When will ..... father be back?

**IV. Finish each sentence, beginning with a word or words, in such a way that it means exactly the same as the sentence given. (30 Marks)**

1. "Halt!" shouted the officer to his men.  
The officer .....
2. You cannot pump the ocean dry.  
The ocean .....
3. The fishermen threw out their nets and waited patiently.  
After .....
4. Stop arguing with your sister or you'll be beaten by your mother.  
Unless .....
5. All teacher in this department have their own abilities.  
There is no .....
6. The books were returned to the library although they were not read.  
Without .....
7. How rich U win is, he is not happy.  
Although .....
8. The sum is so easy that even a child can do it.  
It is such .....
9. I love the doll "Mickey Mouse" most.  
I don't love any other .....
10. He found that his wife was very lazy as soon as he married her.  
No sooner .....
11. Hla Hla was injured in a car accident. She is now in hospital.  
Hla Hla .....
12. If you speak more English, you'll become more fluent.  
The more English .....
13. The twin brothers did not pay attention to their studies.  
Neither of .....
14. Although he had all the necessary qualifications, he didn't get the job.  
In spite of .....
15. Orchids are the most expensive flowers in the market.  
No other .....

**V. Write an essay of three paragraphs on ONE of the following. (20 Marks)**

**Tomorrow Leader**

**The Danger of Smoking**

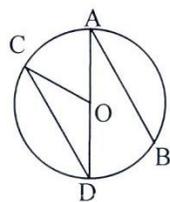
**Personal Hygiene**

**DEFENCE SERVICES ACADEMY  
2017-2018 ENTRANCE EXAMINATION  
MATHEMATICS TEST**

**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. **(22 Marks)**
- (1) An operation  $\odot$  is defined by  $a \odot b = \frac{3ab}{a+b}$ , then the value of  $a$  for which  $a \odot 2a = 4$  is  
A. -3      B. 3      C. 1      D. -1      E. 2
- (2) If  $a - 2$  is a factor of  $a^{n+1} + 5a^n - 10a - 36$ , then  $n =$   
A. 6      B. 5      C. 4      D. 3      E. 2
- (3)  ${}^n C_r + {}^n C_{n-r} =$   
A.  ${}^n C_{2n-1}$       B.  $2^n C_r$       C.  $2 {}^n C_r$       D.  ${}^n C_{n-2r}$       E. none of these
- (4) If the solution set in  $\mathbb{R}$  for the inequation  $3x^2 + kx - 10 < 0$  is  $\left\{x \mid -\frac{2}{3} < x < 5\right\}$ , then  $k =$   
A. 13      B. -13      C. 5      D. 3      E. 10
- (5) In an A.P.,  $S_{15} = 240$ . Then  $U_7 + U_8 + U_9 =$   
A. 48      B. 54      C. 36      D. 72      E. 60
- (6) If  $P = \begin{pmatrix} 1+2x \\ 10 \end{pmatrix}$ ,  $Q = \begin{pmatrix} 2 \\ 1-y \end{pmatrix}$  and  $P + 2Q = \begin{pmatrix} 3 \\ 2y \end{pmatrix}$ , then  $\frac{y}{x} =$   
A. -3      B. -2      C. 2      D. 3      E. -4
- (7) If  $A$  is an event such that  $P(A) = x$  and  $P(\text{not } A) = y$ , then  $x^3 + y^3 =$   
A.  $1 + 3xy$       B.  $1 - 3xy$       C.  $3xy$       D.  $3xy - 1$       E. none of these
- (8) In circle  $O$ ,  $AB \parallel CD$  and  $\angle BAD = 40^\circ$ , then  $\angle COD =$   
A.  $80^\circ$       B.  $105^\circ$       C.  $100^\circ$   
D.  $110^\circ$       E.  $120^\circ$
- 
- (9) The position vector of  $A, B, C$  are  $\vec{a}, \vec{b}$  and  $\vec{c}$  respectively. If  $\overrightarrow{AC} = -2\overrightarrow{CB}$ , then  $\vec{c}$  is  
A.  $-\vec{a} + 2\vec{b}$       B.  $\vec{a} - 2\vec{b}$       C.  $2\vec{a} + \vec{b}$       D.  $2\vec{a} - \vec{b}$       E.  $-2\vec{a} + \vec{b}$
- (10) The smallest value of  $x$  for which  $\tan 3x = -1$  is  
A.  $15^\circ$       B.  $45^\circ$       C.  $135^\circ$       D.  $90^\circ$       E.  $105^\circ$
- (11) The stationary point of the curve  $y = x^2 - 4x$  is  
A. (2, 4)      B. (2, 0)      C. (2, -4)      D. (-2, 4)      E. (0, 4)

**P.T.O. —————>**

**PART (B)**

2. (a) A binary operation  $\odot$  on  $\mathbb{N}$  is defined by  $x \odot y =$  the remainder when  $x^y$  is divided by 5. Is the binary operation commutative? Find the value of  $[(2 \odot 3) \odot 4] + [2 \odot (3 \odot 4)]$ . Is the binary operation associative? **(6 marks)**
- (b) The expression  $6x^3 + ax^2 + bx + 10$  has factor  $2x - 1$  but leaves a remainder  $-20$  when divided by  $x + 2$ . Find  $a, b$  and factorize the expression completely. **(7 marks)**
3. (a) Find the coefficients of  $x^0$  and  $x^3$  respectively in the expansions of  $\left(x - \frac{1}{x^2}\right)^9$ . Are they equal? **(6 marks)**
- (b) Find the solution set of the inequation  $12 - 25x + 12x^2 \leq 0$  by graphical method and illustrate it on the number line. **(7 marks)**
4. (a) The sum of the first three terms of a G.P. is 27 and the sum of the fourth, fifth and sixth terms is  $-1$ . Find the common ratio and the sum to infinity of the G.P. **(6 marks)**
- (b) Use the matrix method to find the solution set of the system of equations:  
 $3x - 7y = 44$  and  $8y + 2x + 34 = 0$ . **(7 marks)**
5. (a) Draw a tree diagram to list all possible outcomes for a family which has three children. Find the probability that (i) only the first child is a girl (ii) the last child is a girl (iii) the last two children born are girls. **(6 marks)**
- (b) AB is a chord joining the points of contact A, B of tangents PA, PB to a circle whose centre is O. Prove that P, B, O, A are concyclic. If the lengths of the tangents be each equal to AB, find  $\angle AOB$ . **(7 marks)**
6. (a) In  $\triangle ABC$ , AD and BE are the altitudes. If  $4\alpha(\triangle DEC) = 3\alpha(\triangle ABC)$ , find  $\angle ACB$ . **(6 marks)**
- (b) The coordinates of A, B and C are (1,3), (5,4) and (1,9) respectively. Find the coordinates of D if ABCD is a parallelogram. **(7 marks)**
7. (a) Calculate  $\lim_{x \rightarrow 2} \frac{x^3 - 8}{\sqrt{x+2} - 2}$ ,  $\lim_{x \rightarrow 0} \frac{\cos x - 1}{\sin^2 x}$  and  $\lim_{x \rightarrow 2} \frac{x^3 - 8}{x^2 + 3x - 10}$ . **(6 marks)**
- (b) If  $\alpha + \beta + \theta = \pi$ , show that  $\sin \alpha - \sin \beta + \sin \theta = 4 \sin \frac{\alpha}{2} \cos \frac{\beta}{2} \sin \frac{\theta}{2}$ . **(7 marks)**

**DEFENCE SERVICES ACADEMY  
ENTRANCE EXAMINATION  
ENGLISH**

**Date: 19.8.2018 Time Allowed: 2 Hours**

**Answer all questions.**

**I. Read the passage.**

Indonesia is a land of surprises, featuring the rich culture and arts of its people amidst the sandy beaches and cool mountains. The volcanoes in Indonesia are among the most active in the world. It has a population of over 170 million with many different ethnic groups and some 250 spoken languages. Jakarta, the capital of Indonesia on the northwest coast of Java, is a place where industries like textiles, chemicals, plastics, etc are concentrated. Not to be missed is one of the world's-wonders the biggest Buddhist temple in the world at Candi Borobudur in Java, built during the ninth century.

In east Java, one can find the most exciting mountain scenery. One can visit mountain resorts such as Tretes and Selecta: take a short ferry ride from the city of Surabaya to Madura for a heart-stopping bull race, filled with excitement.

**A. Write the correct word or words to complete each sentence. (10 Marks)**

1. Many ..... groups live together in Indonesia.
2. The Buddhist temple at Candi Borobudur is ..... in the world.
3. Industries are ..... in Jakarta.
4. One will find a ..... race in Madura.
5. Tretes and Selecta are the ..... in east Java.

**B. Answer each question in one sentence. (10 Marks)**

6. Which features make Indonesia a land of surprises?
7. What kind of country is Indonesia?
8. What is the population of Indonesia?
9. Where is Jakarta situated?
10. How can one get to Madura?

**II. Fill in each numbered blank in the following paragraph with a word from the list given. Write down only the letter of your answer by the number.**

**(20 Marks)**

babies	example	matter	pattern	same
capacity	innate	movements	prefer	speech
consistent	language	observations	psychologist	varied
deaf	learn	over	resemble	words

Recently, doctors have learned that deaf...(1)...babble with their hands. Laura Ann Petitto, a...(2)...at Mc Gill University in Montreal, Canada, has studied how children ...(3)... language. She observed three hearing infants and two...(4)... infants. After watching and videotaping the children for several hundred hours, the psychologist and her assistants made many important...(5)... . For...(6)..., they saw that the hearing children made many different, ...(7)...motions with hands. However, there appeared to be no ...(8)...to these motions. the deaf babies also made many different...(9)...with their hands, but these movements were more ...(10)... and deliberate. The deaf babies seemed to make the...(11)...hand movements over and...(12)...again. During the four-month period, the deaf babies' hand motions started to...(13)...some of the basic hand-shapes used in ASL. The children also seemed to...(14)...certain hand-shapes.

Linguists- people who study language- believe that our ability for language is ...(15)... . In other...(16)..., humans are born with the...(17)...for language. It does not ...(18)...if we are physically able to speak or not. ...(19)...can be expressed in many different way for instance, by...(20)...or by sign.

**P.T.O. —>**

**III. Finish each sentence, beginning with a word or words, in such a way that it means exactly the same as the sentence given. (40 Marks)**

1. The master said, "Please listen to what I am saying carefully."  
The master requested .....
2. Khun San Law's foster-mother treated Nan Oo Pyin very cruelly.  
Nan Oo Pyin .....
3. The maid swept the floor and then polished it.  
After .....
4. I had just sat at the table when the light went out.  
No sooner .....
5. I am not feeling well although I take the prescribed medicine regularly.  
In spite of .....
6. The day was so wet and cold that we stay indoors.  
It was such .....
7. You can't defeat her if you don't practise the tennis regularly.  
Without .....
8. The question was so difficult that no student in the class could answer it.  
The question was too .....
9. Helen was blind and deaf after a mysterious illness.  
Helen became not only .....
10. The Myanmar Times is a weekly journal. The Myanmar Times can help our products reach our target market.  
The Myanmar Times, .....
11. When you ride your bike faster, the danger is greater.  
The faster .....
12. If we walk more quickly, we will reach our destination faster.  
The more .....
13. Aung Kyaw Soe doesn't speak English as fluently as Ma Ma.  
Ma Ma speaks .....
14. Every flower in the National Park looks beautiful.  
There is no .....
15. When she thought that she had worried her father, she was unhappy.  
Thinking .....
16. I won't wake up if the alarm does not go off.  
Unless .....
17. Our village pagoda has been rebuilt. It was destroyed by an earthquake.  
Our village pagoda .....
18. Kyaw Kyaw Lwin is the most industrious student in my class.  
No other .....
19. Einstein was one of the most famous scientists all over the world.  
Very few scientists .....
20. Neither Ko Ko nor Nyi Nyi watched TV last night.  
Both .....

**IV. Write an essay of three paragraphs, not more than 200 words, on ONE of the following. (20 Marks)**

**How to keep ourselves fit**

**My Future Career**

**The best time of a day**

**DEFENCE SERVICES ACADEMY  
ENTRANCE EXAMINATION  
MATHEMATICS**

**Date: 19-8-2018**

**Time Allowed: 2 Hours**

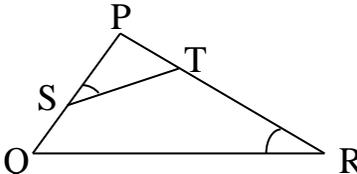
**ANSWER ALL QUESTIONS**

**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. **(22 Marks)**
- (1) Functions  $f$  and  $g$  are given by  $f(x)=2x$  and  $g(x)=x+3$ . If  $(g \circ f)^{-1}(t)=1$ , then  $t=$   
A.  $-5$       B.  $-3$       C.  $2$       D.  $3$       E.  $5$
- (2) It is given that the remainder is  $178$  when  $x^n - 5x^2 - 20$  is divided by  $x - 3$ , then the value of  $n$  is  
A.  $-4$       B.  $4$       C.  $3$       D.  $-3$       E.  $5$
- (3)  ${}^n C_0 + {}^n C_1 + {}^n C_n =$   
A.  $n$       B.  $n+1$       C.  $2$       D.  $n+2$       E. none of these
- (4) Given that  $7, a, b, c, -5$  in an A.P., then the mean of  $a, b, c$  is  
A.  $-2$       B.  $1$       C.  $\frac{3}{2}$       D.  $3$       E.  $4$
- (5) The matrix  $M = \begin{pmatrix} a & 4 \\ 16 & b \end{pmatrix}$  is singular and  $a, b$  are positive integers. Then  $a + b$  cannot be  
A.  $16$       B.  $20$       C.  $34$       D.  $48$       E.  $65$
- (6) If  $A$  is an event such that  $P(A) = x$  and  $P(\text{not } A) = y$ , then  $x^3 + y^3 =$   
A.  $3xy$       B.  $1+3xy$       C.  $3xy-1$       D.  $1-3xy$       E. none of these
- (7) Chords  $AB$  and  $CD$  of a circle intersect at  $P$  within the circle. If  $AP = x$ ,  $PB = x - 2$ ,  $CP = 8$  and  $PD = 3$ , then  $x =$   
A.  $2$       B.  $3$       C.  $4$       D.  $5$       E.  $6$
- (8) If  $\Delta ABC \sim \Delta PQR$ ,  $\alpha(\Delta ABC) + \alpha(\Delta PQR) = 75 \text{ cm}^2$ ,  $AB$  and  $PQ$  are corresponding sides and  $AB : PQ = 4 : 3$ , then  $\alpha(\Delta ABC)$ , in  $\text{cm}^2$ , is  
A.  $25$       B.  $27$       C.  $36$       D.  $48$       E.  $50$
- (9) Given that  $\vec{a} = 3\hat{i} + 4\hat{j}$ . Then the vector with magnitude  $20$  units and in the direction of  $\vec{a}$  is  
A.  $9\hat{i} + 12\hat{j}$       B.  $60\hat{i} + 120\hat{j}$       C.  $21\hat{i} + 28\hat{j}$       D.  $12\hat{i} + 16\hat{j}$       E.  $-12\hat{i} - 16\hat{j}$
- (10) If  $A, B, C$  are the angles of a triangle and  $\tan A = 3$  and  $\tan B = 2$ , then  $\tan C =$   
A.  $1$       B.  $2$       C.  $3$       D.  $4$       E.  $5$
- (11) The gradient of the tangent line to the curve  $y = ax^2 - 4x + 3$  at the point  $x = 1$  is  $-2$ . The value of  $a$  is  
A.  $3$       B.  $2$       C.  $1$       D.  $-3$       E.  $4$

**P.T.O. —————>**

**PART (B)**

2. (a) The functions  $f$  and  $g$  are defined for real  $x$  by  $f(x) = 2x - 1$  and  $g(x) = 2x + 3$ . Evaluate  $(g^{-1} \circ f^{-1})(2)$ . **(6 marks)**
- (b) Given  $f(x) = x^3 + px^2 - 2x + 4\sqrt{3}$  has a factor  $x + \sqrt{2}$ , find the value of  $p$ . Show that  $x - 2\sqrt{3}$  is also a factor and solve the equation  $f(x) = 0$ . **(7 marks)**
3. (a) If the 2<sup>nd</sup> and the 3<sup>rd</sup> term in  $(a + b)^n$  are in the same ratio as the 3<sup>rd</sup> and 4<sup>th</sup> in  $(a + b)^{n+3}$ , then find  $n$ . **(6 marks)**
- (b) Use graphical method to find the solution set of the inequation  $2x(x - 1) < 3 - x$  and illustrate it on the number line. **(7 marks)**
4. (a) The three numbers  $a, b, c$  between 2 and 18 are such that their sum is 25, the numbers 2,  $a, b$  are consecutive terms of an arithmetic progression, and the numbers  $b, c, 18$  are consecutive terms of a geometric progression. Find the three numbers. **(6 marks)**
- (b) Find the inverse of  $\begin{pmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{pmatrix}$  by using the definition of inverse of matrix. **(7 marks)**
5. (a) A die is rolled 360 times. Find the expected frequency of a factor of 6 and the expected frequency of a prime number. If all the scores obtained in these 360 trails are added together, what is the expected total score? **(6 marks)**
- (b)  $PQR$  is a triangle in which  $PQ = PR$ .  $S$  is a point inside the triangle such that  $\angle SPQ = \angle SQR$ .  $T$  is the point on  $QS$  produced such that  $PT = PS$ . Prove that  $PQRT$  is cyclic. **(7 marks)**
6. (a) In the figure  $\angle PST = \angle PRQ$ ,  $PS : SQ = 3 : 1$  and  $PT : TR = 1 : 2$ . If  $PT = 2$ , find the length of  $PS$  and the ratios of  $\alpha(\Delta PST) : \alpha(\Delta PQR)$  and  $\alpha(\Delta PST) : \alpha(QRTS)$ . **(6 marks)**
- 
- (b) The position vectors of  $A$  and  $B$  relative to an origin  $O$  are  $\begin{pmatrix} 5 \\ 15 \end{pmatrix}$  and  $\begin{pmatrix} 13 \\ 3 \end{pmatrix}$  respectively. Given that  $C$  lies on  $AB$  and has position vector  $\begin{pmatrix} 2t+1 \\ t+1 \end{pmatrix}$ , find the value of  $t$  and the ratio  $AC : CB$ . **(7 marks)**
7. (a) If  $x + y + z = \pi$ , show that 
$$\cos \frac{x}{2} + \cos \frac{y}{2} + \cos \frac{z}{2} = 4 \cos \frac{y+z}{4} \cos \frac{z+x}{4} \cos \frac{x+y}{4}.$$
 **(6 marks)**
- (b) If  $y = \ln(\cos 2x)$ , prove that 
$$\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^2 + 4 = 0.$$
 **(7 marks)**

**DEFENCE SERVICES ACADEMY**

**ENTRANCE EXAMINATION**

**ENGLISH**

**Date: 18.8.2019**

**Time Allowed: 2 Hours**

**Answer all questions**

**I. Read the passage.**

Not quite comprehending what the great teacher meant, they looked at one another, but said nothing, and after paying respects to their professor, set forth on their journey home.

After travelling for a number of days their dry rations ran out and the pot and the grain given to them by their professor came in very useful indeed. "How thoughtful our great teacher is!" they felt and got down to the business of cooking themselves a meal. There was rice enough for four of them all right, but they would have to do something about the curry. So they drew lots for the different tasks to be carried out in order to get a decent meal. Thus, the man of music and dancing was to cook the rice. The medico was to buy meat and fish; the astrologer was to gather vegetables; and the philosopher was to get some ghee (which is clarified butter) to cook the curry in. And thus each set out to do his task.

**(A) Write the correct word or words to complete each sentence. (10 Marks)**

- (1) The youth had travelled ..... when their dry rations ran out.
- (2) Each of the youths thought that their professor was very .....
- (3) The pot and the grain became very ..... when their dry rations ran out.
- (4) The four youths had enough ..... but no curry to eat.
- (5) The medico's job was to buy ..... for the curry.

**(B) Answer each question in one sentence. (10 Marks)**

- (6) What did the youths do when they did not understand what their teacher meant?
- (7) When did the youths set out on their journey home?
- (8) What did the youths do before they started on their journey home?
- (9) Why did they each have to carry out different tasks?
- (10) What is ghee and why did they need it?

**II. Fill in each numbered blank with a word from the list given. There are five extra words. Write down only the number of the blank and the word that fills it.**

**(20 Marks)**

also	and	average	began	brain
floating	have	In	knew	learned
rapid	sleep	sleeping	than	that
they	they	to	three	up
are	made	and	about	time

Sleep is very important to humans; the ...(1)... person spends 220,000 hours of a lifetime ...(2)... . Until about thirty years ago, no one ...(3)... much about sleep. Then doctors and scientists ...(4)... doing research in sleep laboratories. They have ...(5)... a great deal by studying people as ...(6)... sleep, but there is still much that ...(7)... don't understand.

Scientists study the body characteristics ...(8)... change during sleep, such as body temperature, ...(9)... wave, blood pressure, breathing, and heartbeat. They ...(10)... study rapid eye movement (REM). These scientists ...(11)... learned that there is a kind of ...(12)... with REM and another kind with no ...(13)... eye movement (NREM).

NREM is divided into ...(14)... stages. In stage one, when you start ...(15)... go stage two, you sleep more deeply, ...(16)... feeling. A sudden noise can wake you ...(17)... . In stage two, you sleep more deeply, ...(18)... a noise will probably not wake you ...(19)... stage three, which you reach in less ...(20)... thirty minutes, the brain waves are less active and stretched out.

**III. Finish each sentence in such a way that it means exactly the same as the sentence that is given. (40 Marks)**

1. Just as I sat down to study, the lights went out.  
No sooner .....
2. If you don't want to be punished, you must work very hard.  
Unless .....
3. May May said to Ma Ma, "How long have you known Maung Soe Thar?"  
May May asked .....
4. The teacher said to her class, "Stop talking while I am teaching."  
The teacher told her class .....
5. Although he worked the whole night, he couldn't finish his work.  
In spite of .....
6. He was driving the car recklessly when the accident happened.  
The car was .....
7. Who invented the airplane?  
By whom .....
8. The day was so wet and cold that we stayed indoors.  
It was such a .....
9. He was punished by his father. He never again made a mistake.  
After he .....
10. The thief entered the house. Nobody heard him.  
The thief entered the house without .....
11. The house is big enough for two families to live in.  
The house is so .....
12. She is too young to be sent abroad alone.  
She is not .....
13. Myanmar is a beautiful country. It is rich in natural resources.  
Myanmar is not only .....
14. When he got home, everyone had had dinner.  
By the time .....
15. Human beings can't live on the moon. Animals can't live on the moon.  
Neither .....
16. Pyin Oo Lwin is a very famous summer resort. I enjoyed visiting it.  
I enjoyed visiting Pyin Oo Lwin, .....
17. When the child saw me, he ran away.  
Seeing .....
18. Everyone student in our class knows how to use a computer.  
There is no .....
19. The philosopher came back empty-handed and so did the medico.  
Both .....
20. As Nyi Lay eats more, he gets fatter.  
The more .....

**IV. Write an essay of three paragraphs, not more than 200 words, on ONE of the following. (20 Marks)**

How I celebrated my last birthday

Reading: A good hobby

Some popular games in Myanmar

**DEFENCE SERVICES ACADEMY**  
**ENTRANCE EXAMINATION**  
**MATHEMATICS**

**Date:** - -2019

**Time Allowed: 2 Hours**

**ANSWER ALL QUESTIONS**

**PART(A)**

1. (a) Let  $N$  be the set of natural numbers. A function  $f$  from  $N$  to  $N$  is given by,  
 $f(x) =$  the sum of all factors of  $x$ . If  $f(16) = 8p - 9$ , then find  $f(p^2)$ . **(4 marks)**
- (b) When the expression  $7x^{21} - 5x^{15} + ax^6$  is divided by  $x+1$ , the remainder is 2.  
Find the value of  $a$ . Hence find the remainder when the expression is divided  
by  $x - 1$ . **(4 marks)**
- (c) The  $n^{\text{th}}$  term of an A.P is  $p$  and the  $(n + 1)^{\text{th}}$  term is  $q$ . Find the first term and  
the fifth term in terms of  $n, p$  and  $q$ . **(4 marks)**
- (d)  $A$  and  $B$  are two points on a circle 3 cm apart. The chord  $AB$  is produced to  
 $C$  making  $BC = 1$  cm. Find the length of the tangent from  $C$  to the circle.  
**(4 marks)**
- (e) The position vectors of the points  $A$  and  $B$ , relative to an origin  $O$  are  
 $\begin{pmatrix} 1 \\ 3 \end{pmatrix}$  and  $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$  respectively. Find the position vector of  $C$  if  $\vec{AC} = 3\vec{BA}$ .  
**(4 marks)**
- (f) Find all the angles between  $0$  and  $360^\circ$  which satisfy the equation,  
 $\sin(2\theta + 15^\circ) = \frac{\sqrt{3}}{2}$ . **(4 marks)**
- (g) Calculate  $\lim_{x \rightarrow 1} \frac{x-1}{\sqrt{x^2+3}-2}$  and  $\lim_{x \rightarrow \infty} \frac{2^x + x^{-x}}{2^x - 2^{-x}}$ . **(4 marks)**

**PART(B)**

2. (a) Let  $f: \mathbb{R} \rightarrow \mathbb{R}$  be defined by  $f(x) = 2x$  and  $g: \mathbb{R} \rightarrow \mathbb{R}$  be given by  
 $g(x) = x - 1$ . Show that  $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$ . **(6 marks)**
- (b) The expression  $6x^3 + ax^2 + bx + 10$  has factor  $2x - 1$  but leaves remainder  
 $-20$  when divided by  $x+2$ . Find  $a$ ,  $b$  and factorize the expression  
completely. **(6 marks)**
3. (a) In the expansion of  $(1 + 2x)^{11}$ , the coefficient of  $x^3$  is  $k$  times the coefficient  
of  $x^2$ . Find  $k$ . **(6 marks)**
- (b) Find the solution set in  $\mathbb{R}$  of the inequation  $2 - x - x^2 > 0$  by graphical  
method and illustrate it on the number line. **(6 marks)**

4. (a) Which term of the progression  $19 + 18\frac{1}{5} + 17\frac{2}{5} + \dots$  is the first negative term?

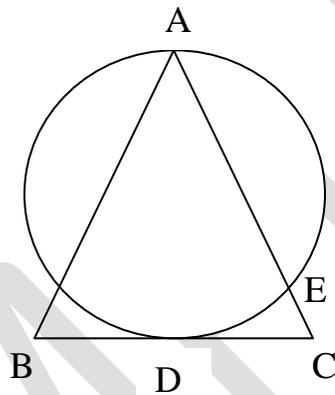
What is the smallest number of terms which must be taken for their sum to be negative? Calculate this sum exactly. **(6 marks)**

- (b) The matrices A and B are given by  $A = \begin{pmatrix} -2 & 3 \\ 1 & 0 \end{pmatrix}$ ,  $B = \begin{pmatrix} 5 & 1 \\ -1 & 2 \end{pmatrix}$ . Find matrices

P and Q such that  $P = 2A + B^2$  and  $AQ + BQ = I$ . **(6 marks)**

5. (a) A box contains six cards numbered as 1,2,3,4,5 and 6. A card is chosen and the card is not replaced. Then another card is chosen. Write down the set of all possible outcomes. Find the probability of getting two numbers where they are both odd numbers. Find also the probability of getting two numbers where the product is an odd number. **(6 marks)**

- (b) A circle passes through the vertex A of an equilateral triangle ABC and is tangent to BC at its midpoint D. Find AE: EC. **(6 marks)**



6. (a) PQRS is a parallelogram. PS is produced to L so that  $SL = SR$  and LR produced meets PQ produced at M. Prove that  $QM = QR$ . If the area of the parallelogram is  $20\text{cm}^2$  and  $PQ = 2PS$ , find the area of  $\triangle LSR$ . **(6 marks)**

- (b) The points A and B have position vectors  $\vec{a}$  and  $\vec{b}$  respectively, relative to an origin O. The point P divides the line segment OA in the ratio 1:3 and the point R divides the line segment AB in the ratio 1:2. Given that PRBQ is a parallelogram, find the position vector of Q. **(6 marks)**

7. (a) If  $\tan B = 3 \tan C$ , prove that  $\tan(B - C) = \frac{\sin 2C}{2 - \cos 2C}$ . **(6 marks)**

- (b) If  $y \cos x = e^x$ , show that  $\frac{d^2y}{dx^2} - 2 \tan x \frac{dy}{dx} - 2y = 0$ . **(6 marks)**