

T ÙÈ&ÉÚ@•æ•Dpæ [ Á/^&@ [ |[ \* ^ Á  
Ùæ ] |^ÁÚæ ^!

Candidate's Name:.....

Father's Name:.....

Roll no.:.....

Signature:.....

### Instructions

1. Attempt all the questions
2. Please use ball point or pen.
3. Please make your choice clearly by writing correct answer in full or indicating it clearly. Marking two choices will be considered as incorrect answer.
4. Using unfair means during the test will disqualify the candidate.
5. Use your own calculator.

### Physical Constants

$$c = 2.998 \times 10^8 \text{ m/s}$$

$$g = 9.8 \text{ m/s}^2$$

$$c = 931.5 \text{ MeV/u}$$

$$h = 6.63 \times 10^{-34} \text{ Js}$$

## Section A: English (30 Marks)

Each question carries equal marks.

*Read the passage carefully to answer the question given below (1 – 10).*

The Civil War was waged because 11 southern states seceded (broke away and started their own government) from the Union and formed the Confederate States of America. The secession took place primarily because of a long-standing debate concerning states rights, and more specifically the issue of slavery. As new territories became states, opponents of slavery and advocates of slavery often clashed over whether or not that state should allow slavery. After violence broke out in Kansas over the issue, and after Kansas entered the Union as a free state, southerners began to believe that the new president, Abraham Lincoln would take away their rights to make local decisions and would abolish slavery. Henceforth, Virginia, North and South Carolina, Georgia, Florida, Alabama, Tennessee, Mississippi, Louisiana, Texas and Arkansas broke away from the Union and formed the Confederate States of America. Richmond, Virginia was made its capital and Jefferson Davis was made president. Kentucky, Maryland, Delaware and Missouri were divided on the issue and were declared "border states". Congress, in an effort to preserve the United States, declared war on the Confederate States of America on April 14, 1861.

The first shots of the Civil War were fired April 12, 1861 at Fort Sumter, South Carolina. Although there were no deaths reported that day, the shots at Fort Sumter signified the start of a long, bloody war that would become the most deadly in the history of the United States. Many major battles such as Bull Run I and II, Antietam and Shiloh, among others, claimed tens of thousands of lives on both sides in 1861 and 1862. Neither the Union or the Confederacy had the upper hand.

The turning point in the war, however, occurred on July 1, 1863, when Confederate and Union armies met at Gettysburg, Pennsylvania. The battle that ensued was one of the bloodiest battles in American history. Eventually, Robert E. Lee's Army of Northern Virginia was driven away from Pennsylvania by Union general George Meade and his Army of the Potomac. The battle did much to cripple the Confederate army. Meanwhile, in the western battlegrounds, Union forces under Ulysses S. Grant had gained control of the Mississippi River and port of New Orleans which effectively split the Confederacy in two.

Robert E. Lee's Army of Northern Virginia was further decimated after Ulysses S. Grant was made commander of the Union Army. Grant waged dozens of surprise attacks against Lee's army in the wilderness of Virginia in 1864. Although the battles resulted in the deaths of tens of thousands of soldiers on the Union side, the Confederate Army was at the brink of collapse. Meanwhile, Union general William T. Sherman marched through Georgia and the Carolinas, destroying everything in his path. The march came to be known as "Sherman's March to the Sea".

Finally, after Union forces had invaded the Confederate capital of Richmond, the Confederate states surrendered on April 9, 1865, at Appomattox Courthouse, Virginia. The Union was preserved.



1. What does secede mean?
  - a. To break away from
  - b. To join
  - c. To accomplish
  - d. To lose
  
2. Which of the following best describes why 11 southern states seceded from the Union?
  - a. Because the government wanted the states to make important decisions concerning slavery.
  - b. Because the southern states wanted the government to make important decisions concerning slavery.
  - c. Because the southern states did not want the government to make important decisions for them concerning slavery.
  - d. Because the government did not want to make important decisions for the southern states concerning slavery.
  
3. Which of the following is true?
  - a. Congress declared war before the first shots were fired at Fort Sumter.
  - b. The first shots fired at Fort Sumter occurred after Congress declared war.
  - c. Congress declared war after the first shots were fired at Fort Sumter.
  - d. Abraham Lincoln was president of the Confederacy.
  
4. Which of the following was NOT a state that seceded from the Union?
  - a. Maryland
  - b. Virginia
  - c. North Carolina
  - d. Florida
  
5. What was the turning point of the Civil War?
  - a. Shiloh
  - b. Appomattox Courthouse
  - c. Antietam
  - d. Gettysburg
  
6. What general was responsible for the retreat of General Lee and his Army of Northern Virginia at the Battle of Gettysburg?
  - a. Ulysses S. Grant
  - b. William T. Sherman
  - c. George Meade
  - d. Jefferson Davis

14. What was the last place you \_\_\_\_\_?

- a. Visit
- b. Visited
- c. Visiting
- d. Visits

15. What do you and your friends usually \_\_\_\_\_ about?

- a. Talk
- b. Talked
- c. Talking
- d. Talks

16. Have you ever \_\_\_\_\_ anything to a friend?

- a. Sell
- b. Sold
- c. Selling
- d. Sells

17. They \_\_\_\_\_ to my office yesterday.

- a. Pay
- b. Paid
- c. Pays
- d. Paying

18. How do you normally \_\_\_\_\_ for meals in a restaurant?

- a. Come
- b. Came
- c. Coming
- d. Camed

19. Marie wanted to buy a new book, \_\_\_\_\_ she could not remember the title or the name of the author.

- a. But
- b. So
- c. Nor
- d. For

20. Everything in our drawers \_\_\_\_\_.

- a. have been stolen
- b. has been stolen
- c. has been stole
- d. have been stole

*Choose the Correct option (21 – 30).*

21. Larry \_\_\_\_\_ a large glass of juice.

- a. Drinking
- b. Drunk
- c. Drank
- d. Drinker

22. She works \_\_\_\_\_ in class.  
a. Good  
b. Well
23. Her work is usually \_\_\_\_\_.  
a. Good  
b. Well
24. He sometimes behaves \_\_\_\_\_ in class.  
a. Bad  
b. Badly
25. It's getting very late \_\_\_\_\_.  
a. I'll have to speed you  
b. I'll have to accelerate you  
c. I'll have to hurry  
d. I'll have to push you
26. Won't Carol and \_\_\_\_\_ go to the movies?  
a. I  
b. Us  
c. Me  
d. Himself
27. A dictionary is a book \_\_\_\_\_ explains the meanings of words.  
a. Which  
b. Who
28. The Todds have lived in Willow Road \_\_\_\_\_ many years.  
a. Since  
b. For
29. Of all the announcers, Gary spoke \_\_\_\_\_.  
a. more clearly  
b. the more clearest  
c. the clearest  
d. more clearer
30. Where is \_\_\_\_\_ invitation to the party?  
a. you're cousen's  
b. your cousen's  
c. yours cousins'  
d. your cousin's

## SECTION B: PHYSICS (70 Marks)

Note: Each question carries equal marks.

### Question 01:

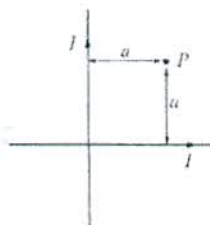
An object is thrown horizontally from the open window of a building. If the initial speed of the object is  $20\text{m/s}$  and it hits the ground  $2.0\text{s}$  later, from what height was it thrown? (neglect air resistance)

### Question 02:

On a frictionless surface, a block of mass  $M$  is moving with speed  $v$  collides elastically with another block of same mass, initially at rest. After the collision, the first block moves angle  $\theta$  to its initial direction and has speed  $v/2$ . Find the speed of the second block after collision.

**Question 03:**

Two straight wires each carrying current  $I$ , are placed perpendicular to each other as shown in figure. What is the net magnetic field at point P located at a distance  $a$  from each wire?





**Question 04:**

A beam of electrons enters in a region of uniform magnetic field  $B$ , directed out of the page. What type of motion is followed by electrons? Calculate the frequency associated with the motion of electrons?

**Question 05:**

A turbine in a steam power plant takes steam from a boiler at  $520^{\circ}\text{C}$  and exhausts it into a condenser at  $100^{\circ}\text{C}$ . What is maximum possible efficiency of the turbine?



**Question 06:**

A gas expands from volume  $V_i$  to  $V_f$  in thermal isolation. Calculate the work done during this process.

**Question 07:**

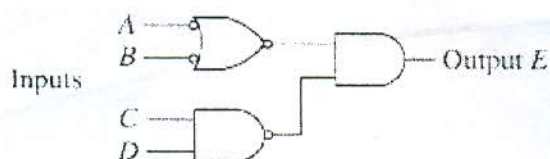
A spring of force constant  $k$  is stretched a certain distance. It takes twice as much work to stretch a second spring by half this distance. Calculate the force constant of the second spring in terms of  $k$ .

**Question 08:**

Yellow light ( $\lambda=589.00\text{ nm}$ ) illuminates Michelson interferometer. How many bright fringes will be counted as mirror is moved through  $1.00\text{ cm}$ .

**Question 09:**

For the logic circuit shown below, write down the Boolean statement that gives output E in terms of inputs A, B, C, D.



**Question 10:**

The disintegration constant  $\lambda$  for a sample of  $^{128}\text{I}$  is  $0.0271 \text{ min}^{-1}$ . Find out its half life.