Notes:

1. The test will have three parts: Part I (Maths and Logical reasoning), Part II (Aptitude) and Part III (Essays).
2. Sample questions for Part I and Part II are given below.
3. Questions in Part I can be objective as well as subjective.
4. Questions in Part II include questions on aptitude for analysing language data.
5. In Part III, you would be asked to write a couple of essays on any given topic. This part will be evaluated only if you score above 50% in Part I and above 55% in Part II.

**PART I - (Mathematics)**

I. Answer all the objective questions, each question carries five marks:

1. Six dice are rolled. What is the probability of getting three pairs?
   (a) 12/123
   (b) 27/710
   (c) 31/250
   (d) None of these
   (e) 25/648

2. A hat contains three cards. One card is black on both sides. One card is white on both sides. One card is black on one side and white on the other. The cards are mixed up in the hat. Then a single card is drawn and placed on a table. If the visible side of the card is black, then what is the chance that the other side is white
   (a) 2/9
   (b) 1/3
   (c) 2/7
   (d) 1/9
   (e) None of these

3. A man can cover a distance in 1hr 24min by covering 2/3 of the distance at 4 km/h and the rest at 5km/h. The total distance is
   (a) 2km
   (b) 5km
   (c) 6km
   (d) 10km
   (e) None of these

II Answer all the questions, each question carries six marks

1. If W(F) is a subspace of a finite dimensional vector space V (F), then show that
   \[ \dim(W) = \dim(V) \text{, iff } W = V. \]

2. If V (F) and W(F) are two subspaces of the vector space U(F), then show that (V \cap W) is a vector space over the same field F
3. Let \( f \) be a homomorphism from the group \((G, \ast)\) into the pair \((H, @)\). Show that the image \((f(G), @)\) is a subgroup of \((H, @)\).

4. Let \( f \) be a homomorphism from the group \((G, \ast)\) into the pair \((H, @)\). Then show that the pair \((\text{Ker}(f), \ast)\) is a normal subgroup of \((G, \ast)\).

**PART II - (APTITUDE)**

1. Look carefully at the sequence of symbols to find the pattern. Select correct pattern.

   (i)
   
   ![Sequence of symbols]
   
   \(\text{Answer: ______________________________}\\
   \)

   (ii)
   
   ![Diagram of shapes]
   
   \(\text{Answer: ______________________________}\\
   \)

   (iii)
   
   ![Sequence of symbols]
   
   \(\text{Answer: ______________________________}\\
   \)
2. For the sentences given below there are at least 2 meanings. Explain each meaning.

Mary saw the boy on the street below drinking coffee.

Meaning 1:

Meaning 2:

3. If PUBLIC is written as QVCMDJ, then QFPQMF is ____________

4. Rearrange the following sentences to make a story that is understandable. Choose the correct option of the sequence of sentences. Give a suitable title to the story.

Title: ______________________________

a. It is guaranteed that that number will only increase with time.
b. But excess can be a beautiful thing.
c. Necessity can be sometimes pleasing and other times an annoyance.
d. I believe that at last count I have 18.
e. Of those certain things, there are some that he cannot have too many of; such as solid white shirts.
f. There are certain things a man needs in his wardrobe.

A. f-e-d-c-b-a
B. c-b-d-e-f-a
C. a-c-e-b-d-f
D. c-b-f-e-d-a

Answer: ______________________________

5. Given below is a sentence encrypted. Decode it.

"VTQ REZF XPJJQOQEIQ DQVGQEO CQ HEX H CHXCHPA VTH V HC ERV CHX." -- AHZUHXRO XHZP

V stands for T
T stands for H
Q stands for E
R stands for O

Answer: ______________________________
6. Papago Problem: Tohono O’odham, formerly known as Papago, is spoken in south central Arizona in the U.S. and in northern Sonora in Mexico.

A. The following are eight Tohono O’odham sentences and their English translations in random order. **Match each Tohono O’odham sentence with its English translation.** (16 marks)

**Pronunciation notes:** A colon ( : ) after a vowel means that the vowel is long. The apostrophe ( ’ ) denotes a consonant called a glottal stop, like the stopping of air flow in the throat between the syllables of the English exclamation uh-oh. The letter c is pronounced like ch in English chair. The letter ñ is pronounced as it is in Spanish, corresponding to the ni sound in the English word onion. A hyphen ( - ) is used to connect a prefix to a word.

1. Ha-cecposid ‘o g wakial g wipsilo.  
   A. I am speaking

2. Pi ‘ac ňeñok ‘a:cim.  
   B. The man is speaking.

3. Ceposid ‘o g wakial g wisilo.  
   C. I am working.

4. Pi ‘o cickpan g cecoj.  
   D. The cowboys aren’t branding the calf.

5. Pi ‘o ceposid g wapkial g wisilo.  
   E. We are not speaking.

   F. The men are not working.

7. Ŋeok ‘o g ceoj.  
   G. The cowboy is branding the calf.

8. Ŋeok ‘añ ‘a:ñi.  
   H. The cowboy is branding the calves.

<table>
<thead>
<tr>
<th>Papago Sentence</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Sentence</td>
<td></td>
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</table>

B. An English speaker trying to learn Tohono O’odham might make mistakes. For each sentence below, place one check mark to indicate whether the sentence is correct or whether it is a mistake. (3 marks)

<table>
<thead>
<tr>
<th>Correct</th>
<th>Mistake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ha-cecposid ‘o g wakial g wisilo.</td>
<td></td>
</tr>
<tr>
<td>Cickpan ‘añ ‘a:ñi.</td>
<td></td>
</tr>
<tr>
<td>Cickpan ‘ac ‘a:cim.</td>
<td></td>
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</tbody>
</table>