Saraswat Education Society's
Sridora Caculo College of Commerce & Management Studies
B.C.A. Semester III End Examination, October/November 2026

CSA-211: REASONING TECHNIQUES

Duration: 2 hours **Total Marks:** 80

Instructions:

i) All questions are compulsory and figures to the right indicate full marks.
ii) Questions of 2 marks to be answered in not more than 40 words.
iii) Questions of 3 marks to be answered in not more than 60 words.
iv) Questions of 4 marks to be answered in not more than 80 words.
v) Questions of 6 marks to be answered in not more than 120 words.

Q.1) Answer the following: **(8 x 2 = 16)**

i) Define syllogism. Name the three terms used in a syllogism.

ii) Differentiate between a strong argument and a weak argument.

iii) What is a Situation Reaction Test? State its purpose.

iv) Name the four main directions and the four sub-directions used in a Direction Sense Test.

v) Define a proposition. Give one example.

vi) Write the converse and the inverse of the implication $p \rightarrow q$.

vii) State the principle of mathematical induction.

viii) Define data sufficiency.

Q.2 A) i) In each question below is given a statement followed by two assumptions numbered I and II. Decide which of the assumptions is/are implicit in the statement. **(03)**

Give answer as:

(A) If only assumption I is implicit.
(B) If only assumption II is implicit.
(C) If either I or II is implicit.
(D) If neither I nor II is implicit.
(E) If both I and II are implicit.

1. Statement—

The college has decided to conduct extra lectures on Saturdays for students who scored below 40% in the internal assessment.

Assumptions—

I. Extra lectures may help weak students improve their performance.
II. Students who scored above 40% do not need any academic help.

2. Statement—

An advertisement: "Use BrightSmile toothpaste — recommended by dentists."

Assumptions—

I. People give importance to the recommendations of dentists.
II. People want to take care of their teeth.

Q.2 A) ii) In each question below are given two statements followed by two conclusions numbered I and II. Taking the statements to be true even if they seem to be at variance with commonly known facts, decide which of the conclusions logically follow(s). **(03)**

Give answer as:

(A) If only conclusion I follows.
(B) If only conclusion II follows.
(C) If either I or II follows.
(D) If neither I nor II follows.
(E) If both I and II follow.

1. Statements—

All pens are pencils.
Some pencils are erasers.

Conclusions—

I. Some erasers are pens.
II. Some pencils are pens.

2. Statements—

No laptop is a tablet.
All tablets are phones.

Conclusions—

I. Some phones are not laptops.
II. No phone is a laptop.

OR

Q.2 A) iii) Each of the following questions consists of a statement followed by two arguments I and II. Decide which of the arguments is/are strong. **(03)**

Give answer as:

(A) If only argument I is strong.
(B) If only argument II is strong.
(C) If either I or II is strong.
(D) If neither I nor II is strong.
(E) If both I and II are strong.

1. Statement—

Should the use of mobile phones be banned inside college campuses?

Arguments—

I. Yes, students get distracted by mobile phones during lectures.
II. No, mobile phones are needed to contact family members in emergencies and to access learning resources.

2. Statement—

Should there be only one university for the whole of India?

Arguments—

I. Yes, this will ensure uniform standards of education throughout the country.
II. No, it will be practically impossible to manage a single university for such a large number of students.

Q.2 A) iv) In each question below is given a statement followed by two courses of action numbered I and II. Decide which of the courses of action logically follow(s) for pursuing. **(03)**

Give answer as:

(A) If only I follows.

(B) If only II follows.

(C) If either I or II follows.

(D) If neither I nor II follows.

(E) If both I and II follow.

1. Statement—

Many students of a college have complained that the college canteen is serving stale food.

Courses of Action—

I. The college should close down the canteen permanently.

II. The college should inspect the canteen and take action against the contractor if the complaint is found to be true.

2. Statement—

The number of road accidents near a school has increased in the last few months.

Courses of Action—

I. Speed breakers should be installed on the road near the school.

II. Traffic police should be deployed near the school during school hours.

Q.2 B) i) Explain the converse and the inverse of an implication. Write the converse and the inverse of the statement: "If it rains, then the match is cancelled." With the help of a truth table, show that the converse and the inverse of $p \rightarrow q$ are logically equivalent to each other but not to $p \rightarrow q$. **(06)**

Q.2 B) ii) Each question given below has a problem and two statements numbered I and II giving certain information. Decide if the information given in the statements is sufficient for answering the problem. Indicate your answer as: **(04)**

(a) If the data in statement I alone are sufficient to answer the question.

(b) If the data in statement II alone are sufficient to answer the question.

(c) If the data either in I or II alone are sufficient to answer the question.

(d) If the data given in both the statements together are not sufficient to answer the question.

(e) If the data in both the statements together are needed.

1. What is Riya's rank from the top in a class of 40 students?

I. Riya is 26th from the bottom.

II. Riya is 3 ranks below Sameer.

2. How is P related to Q?

I. P is the brother of R.

II. R is the daughter of Q.

3. What day of the week was 15th August 2025?

I. 15th August 2024 was a Thursday.

II. 15th August 2026 is a Saturday.

4. How many students are there in the class?

I. Ravi is 12th from the top.

II. Ravi is 5 ranks above Mohan.

Q.3 A) i) Each situation below is followed by four possible responses. Choose the most appropriate response. **(04)**

1. While travelling in a bus, you notice that a co-passenger has got down leaving his bag on the seat. You would:
   (a) ignore it
   (b) hand over the bag to the conductor
   (c) take the bag home
   (d) throw it out of the window
2. You are the class representative and two classmates are quarrelling over a seat in the classroom. You would:
   (a) calm them down and settle the matter amicably
   (b) ignore them
   (c) report them to the Principal at once
   (d) take the side of your friend
3. You have an important examination tomorrow and a friend invites you to a party tonight. You would:
   (a) go to the party and skip revision
   (b) ask your friend to cancel the party
   (c) go to the party and study after midnight
   (d) politely decline and concentrate on revision
4. While walking on the road, you see an injured accident victim lying unattended. You would:
   (a) walk away
   (b) wait for others to help
   (c) call an ambulance and inform the police
   (d) take photographs of the scene

Q.3 A) ii) Let p and q be the propositions: **(02)**

p: Ravi studies hard.

q: Ravi passes the examination.

Express each of the following sentences in symbolic form:

a. If Ravi studies hard, then he passes the examination.

b. Ravi neither studies hard nor passes the examination.

OR

Q.3 A) iii) **Choose the correct answer:** **(04)**

1. 3 : 28 :: 5 : ?

   a. 124 b. 125 c. 126 d. 130

2. 2, 6, 12, 20, 30, ?

   a. 36 b. 40 c. 42 d. 44

3. ACE : BDF :: GIK : ?

   a. HJL b. HIK c. IJL d. HKM

Choose the odd one out:

4. (a) 121 (b) 169 (c) 225 (d) 289 (e) 323

Q.3 A) iv) Let P(x) be the statement "x knows Python" and J(x) be the statement "x knows Java". Express each of the following statements in terms of P(x), J(x), quantifiers and logical connectives. Let the domain consist of all students in your class. **(02)**

a. Every student in your class knows Python or Java.

b. Some students in your class know Python but not Java.

Q.3 B) i) **Study the following information carefully and answer the questions given below:** **(06)**

A company wants to recruit Management Trainees. A candidate must:

I. be a graduate with at least 60% marks.

II. have at least 1 year of work experience.

III. be not less than 21 years and not more than 28 years of age as on 01.11.2026.

IV. have secured at least 50% marks in the selection test.

However, if a candidate fulfils all the above criteria except:

a) (I), but is a post-graduate with at least 55% marks, the case is to be referred to the General Manager.

b) (II), but has completed a six-month internship with a reputed company, the case is to be referred to the HR Head.

Based on the above criteria and the information given about each candidate, mark the answer as:

A) If the candidate is to be selected.

B) If the case is to be referred to the General Manager.

C) If the case is to be referred to the HR Head.

D) If the candidate is not to be selected.

E) If the data provided is not adequate to make a decision.

All cases are given to you as on 01.11.2026.

1. Anita was born on 15.06.2002. She completed B.Com. with 58% marks and M.Com. with 62% marks. She has been working in a bank for the past 2 years and has scored 70% marks in the selection test.
2. Rohan is 26 years old. He completed B.Sc. with 72% marks and has scored 65% marks in the selection test. He has not worked anywhere but has completed a six-month internship with a reputed IT company.
3. Sanjay was born on 10.08.1997. He completed BCA with 68% marks, has 3 years of work experience and has scored 55% marks in the selection test.

Q.3 B) ii) Using the laws of algebra of propositions, prove that the following statements are logically equivalent: **(04)**

$$\neg(p \vee q) \vee (\neg p \wedge q) \quad \text{and} \quad \neg p$$

Q.4 A) i) Using the method of proof by contradiction, prove that if n^2 is an even integer, then n is an even integer. **(04)**

Q.4 A) ii) **Read the following information carefully:** **(02)**

'A + B' means 'A is the father of B'.

'A − B' means 'A is the wife of B'.

'A × B' means 'A is the brother of B'.

'A ÷ B' means 'A is the daughter of B'.

Evaluate the following TWO questions:

1. If M × N + T, then how is M related to T?

2. Which of the following expressions indicates 'K is the mother of L'?

a. K ÷ J + L b. K − J + L c. K − J × L d. L + J − K

OR

Q.4 A) iii) Using a truth table, determine whether the following statements are logically equivalent or not: **(04)**

$$p \rightarrow (q \vee r) \text{ and } (p \rightarrow q) \vee (p \rightarrow r)$$

Q.4 A) iv) **Construct a blood relation diagram and answer the following question:** **(02)**

Pointing to a photograph of a man, Anil said, "He is the son of the only son of my grandfather." How is the man in the photograph related to Anil?

Q.4 B) i) Using the principle of mathematical induction, prove that for all $n \geq 1$, **(06)**

$$1/(1\cdot2) + 1/(2\cdot3) + 1/(3\cdot4) + \ldots + 1/[n(n+1)] = n/(n+1)$$

Q.4 B) ii) **Study the table and answer the questions:** **(06)**

Production of cars (in thousands) by three different companies over five years:

Years	Company X	Company Y	Company Z
2020	120	150	90
2021	135	160	110
2022	150	140	125
2023	170	175	130
2024	160	190	150

a. What is the percentage increase in the production of Company X in 2022 as compared to 2020?

b. What is the average annual production of Company Z over the given five years?

c. What is the respective ratio between the production of Company Y in 2022 and the production of Company X in 2024?

Q.5 A) i) **Read the following information carefully and answer the questions that follow:** **(03)**

Six friends A, B, C, D, E and F are sitting in a row facing North.

- C sits at the extreme left end.
- D sits at the other extreme end.
- E sits to the immediate right of C.
- B sits to the immediate left of D.
- A does not sit next to B.

1. Who sits between A and B?

(A) C (B) E (C) F (D) D (E) None of these

2. Who sits third to the left of D?

(A) A (B) E (C) F (D) C (E) None of these

3. How many people sit between C and B?

(A) One (B) Two (C) Three (D) Four (E) None of these

Q.5 A) ii) Draw the logical Venn diagram that best represents the relationship among each of the following groups of items. Justify each diagram in one line. **(03)**

1. Doctors, Women, Teachers
2. Goa, India, Asia
3. Fruits, Mangoes, Vegetables

OR

Q.5 A) iii) **Read the following information carefully and answer the questions that follow:** **(03)**

Six students P, Q, R, S, T and U scored different marks in a test.

- P scored more than Q but less than T.
- R scored less than Q but more than S.
- U scored more than T.

1. Who scored the highest marks?
   (A) T (B) P (C) U (D) Cannot be determined (E) None of these
2. Who is third from the bottom?
   (A) R (B) Q (C) P (D) S (E) None of these
3. What is P's rank from the top?
   (A) Second (B) Third (C) Fourth (D) Cannot be determined (E) None of these

Q.5 A) iv) **Study the information carefully and select the correct answer:** **(03)**

Give answer as:

A. If only conclusion I is true.
B. If only conclusion II is true.
C. If either conclusion I or II is true.
D. If neither conclusion I nor II is true.
E. If both conclusions I and II are true.

If 'P # Q' means 'P > Q'; 'P $ Q' means 'P < Q'; 'P % Q' means 'P = Q'; 'P & Q' means 'P ≥ Q'; 'P @ Q' means 'P ≤ Q'

1. Statements: M & N; N # K; K % L
Conclusions: I. M # L II. N $ L

2. Statements: A @ B; B % C; C & D
Conclusions: I. A $ C II. A % C

Q.5 B) i) **Construct a diagram for the following information and answer the questions given below:** **(04)**

Riya starts from her house and walks 10 m towards North. She then turns right and walks 20 m. She turns right again and walks 15 m. Finally, she turns right and walks 8 m to reach her college.

1. Calculate the distance and direction of the college with respect to her house.
2. Calculate the total distance travelled by Riya to reach her college.

Q.5 B) ii) **Solve the following questions:** **(04)**

1. What was the day of the week on 26th January 2001?
2. Find the angle between the hour hand and the minute hand of a clock at 7:45.

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