



M 7772

Reg. No. : .....

Name : .....

I Semester B.Sc. Degree (CCSS-Supple./Improv.)  
Examination, November 2014  
CORE COURSE IN MATHEMATICS  
1B01 MAT : Methodology and Perspectives of Sciences  
(2013 and Earlier Admn.)

Time : 3 Hours

Max. Weightage : 30

1. Fill in the blanks :
- a) The best known scientific method is \_\_\_\_\_
  - b) If  $p$  and  $q$  are false then  $p \wedge q$  is \_\_\_\_\_
  - c) The negation of the statement "Kerala is in India" is \_\_\_\_\_
  - d) Ethics in science indicate \_\_\_\_\_ in scientific works. (Weightage 1)

Answer any 7 from the following (Weightage 1 each) :

- 2. Define and distinguish between hypothesis, theory and law.
- 3. Define and distinguish between positivism and falsification.
- 4. Illustrate the two indirect proof methods with examples.
- 5. Define contradiction and given an example.
- 6. Let  $p$  be "He is rich" and  $q$  be "He is happy". Give a simple verbal sentence which describes each of the following statements :
  - a)  $\neg p$
  - b)  $q \rightarrow p$
  - c)  $p \vee q$
  - d)  $q \rightarrow \neg p$
- 7. Determine the contra positive of each statement given below :
  - a) If John is a poet, then he is poor.
  - b) Only if Marc studies will he pass the test.



8. Negate the following statement :

$$\forall \epsilon > 0, \exists n_0 \in \mathbb{N}, \forall n \geq n_0, |a_n - L| < \epsilon.$$

9. Define conjunction and negation. Also draw their truth tables.

10. Write the contra positive and converse of the statement "If Baiju works, he will earn money".

11. Express the following sentences involving predicates in symbolic form :

a) All students are clever.

b) Some students are not successful.

(Weightage 7×1=7)

Answer any 7 from the following (Weightage 2 each) :

12. Explain to a person who has never really thought about the value of education why learning about science is important.

13. "Science can never be truly objective." What are your thoughts on this statement ?

14. Compare and contrast between hypotheses, theory and law.

15. Why are samples used in research ? What is meant by "representative sample" ?

16. Discuss software models.

17. Discuss the influence of computers in mathematics.

18. Show that  $p \leftrightarrow \neg q$  does not logically imply  $p \rightarrow q$ .

19. Verify the proposition  $(p \wedge q) \wedge \neg(p \vee q)$  is a contradiction.

20. Show that the following argument is a fallacy :

$$p \rightarrow q, \neg p \vdash \neg q$$

21. Test the validity of the following argument :

If it rains, Biju will be sick.

It did not rain.

-----  
Biju was not sick.



22. Write down the truth table for the following and state whether it is a tautology or not :

$$(p \vee q) \wedge (\neg q) \rightarrow p \wedge \neg q.$$

(Weightage 7×2=14)

Answer any two from the following (Weightage 4 each) :

23. Write an essay on critical thinking strategies.

24. Compare and contrast mathematical methods and scientific methods.

25. a) Write down the truth table for the following and state whether it is a tautology or not :

$$(p \rightarrow (\neg p)) \rightarrow \neg p.$$

b) Test the validity of the following argument :

All educated persons are well behaved.

Ram is educated.

No well-behaved person is quarrelsome.

-----  
Ram is not quarrelsome.

(2×4=8)