



M 5472

Reg. No. :

Name :

I Semester B.A./B.Sc./B.Com./B.B.A./B.B.A.T.T.M./B.B.M./B.C.A./B.S.W./
B.A. Afsal-UI-Ulama Degree (CCSS – Regular/Supple./Improvement)

Examination, November 2013

CORE COURSE IN MATHEMATICS

1B01 MAT : Methodology and Perspectives of Sciences

Time: 3 Hours

Max. Weightage : 30

1. Fill in the blanks :

- If p and q are false then $p \vee q$ is _____
- A counter example for the statement $\forall x \in \mathbb{R} \ x \geq x^2$ is _____
- By De Morgan's laws $\neg(p \wedge q)$ is _____
- The negation of the statement ' $3 + 5 = 32$ ' is _____ (Wt.-1)

Answer **any seven** from the following (weightage **1 each**) :

- Write a short note on Empiricism.
- Which are the different areas of science ?
- Why should scientific tests be reproducible ?
- Explain the term variable in an experiment.
- Write the truth table for the proposition $p \rightarrow q$.
- Determine the converse and contrapositive of the following statement 'If Mumbai is in India then $2 + 7 = 13$ '.

P.T.O.



8. Explain the term "negation". Give one example.
9. State the principle of substitution.
10. Explain the terms valid argument and fallacy.
11. Show that $\neg(p \vee q) \vee (\neg p \wedge q) \equiv \neg p$. (7×1=7)

Answer **any seven** from the following. Weightage **2 each**.

12. 'There must be a healthy balance between basic and applied research'. Discuss.
13. "Interdisciplinary studies are becoming more common in science". What are your thoughts on this statement ?
14. Write a short note on falsification.
15. Why is a critical thinking is so important for the progress of science.
16. Find a counter example for each statement where $u = \{3, 5, 7, 9\}$ is the universal set.
 - i) $\forall x, x$ is odd
 - ii) $\forall x, x$ is prime.
17. Show that $p \leftrightarrow \neg q$ does not logically imply $p \rightarrow q$.
18. Define the terms universal quantifier and existential quantifier. Give one example each.
19. Explain the term conditional statement and give the truth table.
20. Prove that $\neg(\forall x p(x)) \equiv \exists x \neg p(x)$.
21. Determine the validity of the following statement :
 $p \rightarrow q, \neg q \leftarrow \neg p$.



22. Write the negation of each statement as simply as possible.

a) If she works, then she will earn money.

b) He swims if and only if the water is warm.

(7×2=14)

Answer **any two** from the following. Weightage **4 each** :

23. 'Science can never be truly objective' what are your thoughts on this statement ?

24. Write a note on light and the aether.

25. Explain the terms proof by contradiction, vacuous proof and trivial proof. Give a proof by contradiction to the theorem " $\sqrt{2}$ is irrational".

(2×4=8)
