UNIVERSITY OF PERADENIYA

CENTRE FOR DISTANCE AND CONTINUING EDUCATION

Bachelor of Arts (External –New Syllabus) Examination 100 Level – 2024

ශාස්ත්‍රවේදී උපාධි (බාහිර - නව නිර්දේශය) පරීක්ෂණය 100 මට්ටම - 2024

கலைத்தேர்வுப் பரீட்சை (வெளிவாரி–புதிய பாடத்திட்டம்) 100 வது தேர்ச்சி மட்டம் – 2024

(SUPE 104- LOGIC AND SCIENTIFIC METHOD)

කාලය පැය (03) තුනයි.
மூன்று(03) மணித்தியாலங்கள்.
Time three (03) Hours.

තොපැහැදිලි අත් අකුරුවලට ලකුණු කපනු ලැබේ.
எழுத்து தெளிவில்லாதவிடத்து புள்ளிகள் குறைக்கப்படும்.
Marks will be deducted for illegible hand writing.

පළමු කොටසෙන් අඩුම තරමේ ප්‍රශ්න දෙකක් (02) ද
දෙවන කොටසෙන් අඩුම තරමේ ප්‍රශ්න එකක් (01) ද
තේරාගෙන ප්‍රශ්න **පහකට (05)** පමණක් පිළිතුරු සපයන්න
பகுதி ஒன்றில் குறைந்தது இரண்டு வினாக்களுக்கும் பகுதி
குறைந்தது ஒரு வினாவுமாக மொத்தம் (05) வினாக்களுக்கு மட்டும் விடையளிக்குக.
Answer **Five** (05) Questions only, selecting at least
two (02) from part I and at least **one** (01) from part II.

මෙම ප්‍රශ්න පත්‍රයේ අඩංගු ප්‍රශ්න සංඛ්‍යාව 10 කි.
There are **10** questions in the question paper.
இந்த வினாப்பத்திரத்தில் 10 வினாக்கள் உள்ளன.

PART I

(01) Symbolize the following arguments giving your scheme of abbreviation and show that they are valid, by deriving the conclusion from the premises.

(i) It is not the case that both Ravi and Guru are clever. When it is given that Ravi is clever then Guru is clever. Therefore, Ravi is not clever.

(ii) If the Earth is a circle, there is water in Jupiter or in Mars. There is no water neither in Jupiter nor Mars. Therefore, the Earth is not a circle.

(iii) If and if only David Hume is an empiricist Hagel is an idealist. If Hegel is an idealist then Karl Mark is a materialist. Therefore, if David Hume is an empiricist then Karl Marx is a materialist

(iv) On the condition that if life is joyful, he does not realize the meaning of life then he wastes his life. On the condition that if life is joyful, he wastes his life then he does evil deeds. Therefore, if he does not realize the meaning of life, he does evil deeds.

(04x5=20 Marks)

P.T.O.

(02) (a) Symbolize the following arguments giving your scheme abbreviation and test the validity of them by the method of <u>Indirect truth table.</u>

(i) Both mother and father are teachers. If mother is not a teacher then father is not a driver. Therefore, if father is not a driver then he is a teacher.

(ii) **Either** studying Logic improves your abstract thinking **or** studying mathematics improves your abstract thinking. If studying logic does not improve your abstract thinking then studying mathematics improves your abstract thinking. Therefore, If studying mathematics does not improve your abstract thinking then studying Logic will improve your abstract thinking.

(iii) If and if only Jack is going abroad Jill will marry John. If she did not marry John then she will go abroad. Therefore, If Jill goes abroad then John will marry another girl.

(04x3=12 Marks)

(b) If it is given that 'P' is true and 'Q' is false, determine whether the following symbolic sentences are true, false or that their truth value cannot be determined without using truth tables. (Make your answers as brief as possible stating only the essential steps)

i) $[(P \wedge Q) \rightarrow (R \wedge S)]$
ii) $[(\sim P \vee \sim Q) \vee (P \vee R)]$
iii) $[(\sim P \rightarrow (Q \vee R)) \rightarrow \sim P]$,
iv) $[(\sim P \wedge \sim Q) \leftrightarrow (P \wedge R)]$

(02x4=08 Marks)

(03) Prove the following theorems by the method of derivation.

i) $(\sim P \rightarrow (P \rightarrow \sim P))$
ii) $[((P \rightarrow Q) \rightarrow P) \rightarrow P]$
iii) $[((P \wedge Q) \wedge (Q \vee R) \leftrightarrow (Q \wedge P)]$
iv) $[(P \wedge Q) \rightarrow (P \leftrightarrow Q)]$

(05x4=20 Marks)

(04)   Symbolize the following arguments in terms of classes and determine their validity by using Venn diagrams.

    i)   All Countries are rich. Kandy is not a country. Therefore, Kandy is not rich.

    ii)   Some girls are clever. Some clever ones are tall. Therefore, some tall ones are girls.

    iii)   No crow is white. This bird is white. Therefore, this bird is not a crow.

    iv)   All teachers are kind. Some teachers are not Logic teachers. Therefore, some Logic teachers are not kind.

(04x5=20 Marks)

(05)   Write brief notes on **any four** of the following with examples.

    i)   Truth and validity

    ii)   Deductive and inductive reasoning

    iii)   Class product

    iv)   Indirect method of truth table

    v)   Advantages of learning Logic

    vi)   History of Logic

20

(05x4=16 Marks)

PART II

(06)   a) What is the demarcation theory of Karl Popper?

(04 Marks)

P.T.O.

b) Distinguish between following sciences.

    i)   Sciences and Non-sciences.

    ii)   Formal and Normative sciences.

    iii)   Empirical and Non-empirical sciences.

    iv)   Applied and Pure sciences.

                                     (04x4=16 Marks)

(07) Explain the following scientific tests with examples.

   i) Observation   ii) Experimentation

   iii) Crucial Test   iv) Case study method

                                      (05x4=20 Marks)

(08) a) Explain the classical interpretation of probability with examples.

                                         (08 Marks)

b) When two cards are drawn in succession from a pack of 52 playing cards, without replacing the first card after drawing, what is the probability of followings?

    i) The probability of the drawn cards being the seven of Hearts and king of spades.

    ii) The probability of the drawn cards being the Queen of Diamond and Queen of Hearts.

                                      (02x6=12 Marks)

(09) a) Define what is "Objectivity".

(05 Marks)

b) "Natural sciences are more objective than social sciences". Argue for or against this claim.

(15 Marks)

(10) Write short notes on **any four** the of followings:

i) Scientific Explanation

ii) Relativity methodology of Thomas Khun

iii) Features of sound scientific hypothesis

iv) Difference between Laws and Theories

v) Scientist and Methodologist

vi) Science and Environment

(05x4=20 Marks)