PG Odd Semester (CBCS) Exam., December—2016

PHILOSOPHY

(1st Semester)

Course No. : PHICC–103

(Symbolic Logic)

Full Marks : 70
Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer **five** questions, taking **one** from each Unit

UNIT—I

1. *(a)* What do you understand by 'Truth and Validity' in logic?

(b) Write a short note on 'inclusive and exclusive disjunction'.

(c) Symbolize the following :

(i) If *A* wins its first game, then it is not the case that either *C* or *D* wins their first game.

(ii) The race is not to the swift, nor the battle to the strong.

(iii) Both Amherst and Colgate win their games only if Dartmouth does not win its first game. 4+4+6=14

2. *(a)* Use truth tables to determine the validity or invalidity of each of the following arguments : 2½×2=5

(i) $p \quad (q \;\; r)$

$\sim (q \;\; r) \quad \sim p$

(ii) $p \quad q$

$q \quad p$

$\overline{\quad}$

$p \quad q$

(b) Use truth tables to characterize the following statement forms as tautologous, contradictory or contingent : 3×3=9

(i) $(p \;\; q) \quad p$

(ii) $(p \quad \sim p) \; (\sim p \quad p)$

(iii) $[(p \quad q) \quad q] \quad q$

UNIT—II

3. *(a)* Construct a formal proof of validity for each of the following arguments : 3×3=9

(i) *A* ~(*B* *C*)
(*D* *B*) *C*
D
~ *A*

(ii) *E* *F*
G *F*
(*E* *G*) *F*

(iii) *O* (*P* *Q*)
P (*Q* *R*)
O (*P* *R*)

(b) Write all the 19 rules of inference and replacement. 5

4. *(a)* Use the method of conditional proof to verify that the following are tautologies : 3×3=9

(i) (*A* *B*) [*A* (*A* *B*)]

(ii) (*P* *Q*) [~(*Q* *R*) ~(*R* *P*)]

(iii) [*P* (*Q* *R*)] [*Q* (*P* *R*)]

(b) Use the method of indirect proof to verify that the following are tautologies : 2½×2=5

(i) (*A* *B*) (~ *A* *C*)

(ii) *A* (*A* *B*)

UNIT—III

5. Use the strengthened method of conditional proof to prove the validity of the following arguments : 3+3+3+3+2=14

(a) *A* *B*
A (*A* *B*)

(b) (*A* *B*) [(*C* *D*) *E*]
A [(*C* *D*) *E*]

(c) *A* *B*
B [(*C* ~~*C*) *D*]
A *D*

(d) *Q* (*R* *S*)
[*R* (*R* *S*)] (*T* *U*)
(*T* *Q*) (*U* *V*)
Q *V*

(e) $(E \quad F) \quad G$

$H \quad (I \; J)$

$(E \quad G) \; (H \quad I)$

6. Construct an indirect proof for the following arguments : 4+4+4+2=14

(a) A

$B \quad (B \quad C)$

(b) $(H \quad I) \; (J \quad K)$

$(J \quad K) \quad L$

$\sim L$

$\sim (H \quad J)$

(c) $(V \quad \sim W) \; (X \quad Y)$

$(\sim W \quad Z) \; (Y \quad \sim A)$

$(Z \quad \sim B) \; (\sim A \quad C)$

$V \; X$

$\sim B \; C$

(d) $A \quad (B \; C)$

$A \quad C$

C

UNIT—IV

7. Prove the invalidity of the following arguments by the method of assigning truth values : 4+4+4+2=14

(a) $T \quad U$

$U \quad (V \; W)$

$V \quad (T \quad X)$

$T \quad X$

$T \; X$

(b) $E \quad (F \quad G)$

$G \quad (H \; I)$

$\sim H$

$E \quad I$

(c) $A \quad B$

$C \quad D$

$B \quad C$

$A \quad D$

(d) $(O \quad P) \quad Q$

$Q \quad (P \quad R)$

$O \quad (\sim S \quad P)$

$(S \quad Q) \quad \sim R$

$P \quad \sim Q$

8. Prove the invalidity of each of the following by quantification method : 4+4+4+2=14

(a) $(\;\; x)(Ax \;\; Bx)$

Ac

$\;\; Bc$

(b) $(\;\; x)(Kx \;\; Lx)$

$(\;\; x)(\sim Kx \;\; \sim Lx)$

$\;\; (\;\; x)(Lx \;\; \sim Kx)$

(c) $(x)(Ex \quad Fx)$

$(x)(Gx \quad Fx)$

$\;\; (x)(Ex \quad Gx)$

(d) $(\;\; x)(Dx \;\; Px)$

$(\;\; x)(Dx \;\; Sx)$

$\;\; (\;\; x)(Px \;\; Sx)$

Unit—V

9. Construct formal proof of validity for the following arguments : 2+4+4+4=14

(a) $(x)(Ax \quad Bx)$

$\sim Bt \;\; / \quad \sim At$

(b) $(x)(Fx \quad \sim Gx)$

$(\;\; x)(Hx \;\; Gx)$

$\;\; (\;\; x)(Hx \;\; \sim Fx)$

(c) $(x)(Kx \quad Lx)$

$(x)[(Kx \;\; Lx) \quad Mx]$

$\;\; (x)(Kx \quad Mx)$

(d) $(x)[Sx \quad (Tx \quad Ux)]$

$(x)[Ux \quad (Vx \;\; Wx)]$

$\;\; (x)[Sx \quad (Tx \quad Ux)]$

10. Explain in detail preliminary quantification rules with suitable examples. How do you differentiate propositional logic into singular and general categories? 10+4=14

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