Name: Muhammad Uzair
Roll No.: L1F18BSCS0311
Section- H

Database Assignment 4

Q.1

Single Combination	Double Combination	Triple Combination
A→B (T)	AB→C (T)	ABC→D (F)
A→C (F)	AB→D (F)	ABC→E (F)
A→D (F)	AB→E (F)	ACD→B (T)
A→E (F)	AC→B (T)	ACD→E (F)
B→A (T)	AC→D (F)	ACE→B (T)
B→C (T)	AC→E (F)	ACE→D (F)
B→D (F)	AD→B (T)	ABD→C (T)
B→E (F)	AD→C (T)	ABD→E (F)
C→A (F)	AD→E (F)	ABE→C (T)
C→B (F)	AE→B (T)	ABE→D (F)
C→D (F)	AE→C (T)	BCD→A (T)
C→E (F)	AE→D (F)	BCE→D (F)
D→A (F)	BC→A (T)	BCD→E (F)
D→B (F)	BC→D (F)	BCE→A (T)
D→C (T)	BC→E (F)	CDE→A (F)
D→E (F)	BD→A (T)	CDE→B (F)
E→A (F)	BD→C (T)	BDE→A (T)
E→B (F)	BD→E (F)	BDE→C (T)
E→C (T)	BE→A (T)	ADE→B
E→D (F)	BE→C (T)	ADE→C
	BE→D (F)	
	CD→A (F)	
	CD→B (F)	
	CD→E (F)	
	CE→A (F)	
	CE→B (F)	

CE → D (F)
DE → A (F)
DE → B (F)
DE → C (T)

Four combinations	Five combinations
ABCD → E (F)	ABCDE → ABCDE (T)
ABCE → D (F)	
ACDF → B (T)	
ABDE → C (T)	
BCDE → A (T	

Q.2.

a) R1 (ABCDEFG)
FDs = {A → B, BC → DE, AEG → G}.
Closures of :-

(a)

$(BC)^+ \mid = BCDE$
$(AC)^+ \mid = ABCDE$

b) R2(ABCDE)
FDs = {A → BC, CD → E, B → D, E → A)
Closures of :-

$(A)^+ \mid = ABCDE$
$(B)^+ \mid = BD$
$(E)^+ \mid = EABCD$
$(CD)^+ \mid = CDEAB$

Q.3

(a)

R3(ABCDEF)

FD's = {AB → C, C → D, B → AE}

Not exists	Left	Middle	Right
F	B	C	D
		A	E

$(F)^+ \models F$

$(FB)^+ \models ABCDEF$ (S.K) (C.K)

$(FBC)^+ \models ABCDEF$ (S.K) ~~(C.K)~~

$(FBA)^+ \models ABCDEF$ (S.K) ~~(C.K)~~

$(FBCD)^+ \models ABCDEF$ (S.K) ~~(C.K)~~

$(FBAD)^+ \models ABCDEF$ (S.K) ~~(C.K)~~

$(FBCAD)^+ \models ABCDEF$ (S.K) ~~(C.K)~~

$(FBCAE)^+ \models ABCDEF$ (S.K) ~~(C.K)~~

$(FBCADE)^+ \models ABCDEF$ (S.K) ~~(C.K)~~

(b)

R4(ABCDEFGHIJK)

FD's = {A → DK, CG → H, CJ → DG, G → BEI, H → }

Not exists	Left	Right	Middle
F	A	B	G
	C	I	H
	J	D	
		E	
		K	

$(F)^+ = F$

$(FA)^+ = FADK$

$(FC)^+ = FC$

$(FJ)^+ = FJ$

$(FACJ)^+ = FACJDGBEIHK$ (S.K) (C.K)

$(FACJG)^+ = FACJGBCDEHI$ (S.K) ~~(C.K)~~

$(FACJBG)^+ = ABCDEFGHIJK$ (S.K) ~~(C.K)~~

$(FACJDG)^+ = ABCDEFGHIJK$ (S.K) ~~(C.K)~~

$(FACJEG)^+ = ABCDEFGHIJK$ (S.K) ~~(C.K)~~

$(FACJGH)^+ = ABCDEFGHIJK$ (S.K) ~~(C.K)~~

$(FACJIG)^+ = ABCDEFGHIJK$ (S.K) ~~(C.K)~~

$(FACJBIDEGHK)^+ = ABCDEFGHIJK$ (S.K) ~~(C.K)~~

$(FACJGK)^+ = ABCDEFGHIJK$ (S.K) ~~(C.K)~~

(c)

R5 {WXYZ}

FD's = {Z→W, Y→XZ, XW→Y}.

Not exist	Right	Middle	left
		W	
		X	
		Z	
		Y	

$(W)^+ 1 =$ W

$(X)^+ 1 =$ WXY

$(Y)^+ 1 =$ YXZW (S.K) (C.K)

$(Z)^+ 1 =$ ZW

$(WX)^+ 1 =$ WXYZ (S.K) (C.K)

$(WY)^+ 1 =$ WXYZ (S.K) ~~(C.K)~~

$(WZ)^+ 1 =$ WZ

$(WXY)^+ 1 =$ WXYZ (S.K) (C.K)

$(WXZ)^+ 1 =$ WXYZ (S.K) ~~(C.K)~~

$(WXYZ)^+ 1 =$ WXYZ (S.K) ~~(C.K)~~

(d)

W	X	Y	Z
a1	1	6	11
a2	2	7	12
a3	3	8	13
a4	4	9	14
a5	5	10	15