B.TECH-CSE Assignment-2
Semester-I(Odd),Session:2025-26
BCS-303:Discrete structure and Theory of Logic

Unit-2 **Unit-Name**: Functions and Boolean algebra	**Course Outcome: CO2 –** Apply fundamental concepts of functions and Boolean algebra for solving the problems of logical abilities.
Date of Distribution:	**Faculty Name: Mr. Anil Gupta**

Sr.	MANDATORYQUESTIONS	BL
1	Let $\to R, g: R \to R,$ f:R where R is the set of real numbers be given $x^2 - 2$ by f(x) = And g(x) = x+4.find fog and gof.	3
2	Consider the function f:{1,2,3,4,5,6}→{a,b,c,d} given by $f = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ a & a & b & b & b & c \end{pmatrix}$ Find f ({1,2,3}), f^{-1}({a,b}), and f^{-1}(d)	2
3	Let f and g be functions from R to R defined by f(x)= ax+b ,g(x)= 1-x+ x^2 . If (gof) =$9x^2$-9x+3, determine a,b.	3
4	Let f(x)=x+2, g(x) = x-2, h(x) =3x find i) fog ii)fogoh.	3
5	Define function. Explain different types of functions with suitable example.	2
6	If f : A →B, g : B→ C are invertible functions, then show that gof : A →C is invertible and $(gof)^{-1} = f^{-1} o\ g^{-1}$	3
7	Find the value of k, such that f o g = g o f (i) $f(x) = 3x + 2$, $g(x) = 6x - k$ (ii) $f(x) = 2x - k$, $g(x) = 4x + 5$	3
8	Prove the following laws:- (i)(a *b)'=(a' +b') (ii) (a+b)'=(a' *b')	4
9	Using Boolean identities, reduce the given Boolean expression: F(X, Y, Z) = X′Y + YZ′ + YZ + XY′Z′.	4
10	What is the simplified sum of product form for the Boolean expression: (A + B' + C') (A + B' + C)(A + B + C')	4
11	Reduce the following Boolean expression: F(P ,Q, R)=(P+Q)(P+R)	3

12	Minimize the following Boolean function by using k-map F(A, B, C, D) = Σm(0, 1, 2, 5, 7, 8, 9, 10, 13, 15)	4
13	Minimize the following Boolean function by using k-map F(A, B, C) = Σm(0, 1, 6, 7) + Σd(3, 5)	4
14	Prove the following (i) a+ a=a (ii) a * a = a	3
15	Simplify: $F = A.B.C + \bar{A} + A.\bar{B}.C$	3
16	If f (x) = 2x and g(x) = x+1, then find (f∘g)(x) if x = 1.	2
	SUPPLEMENTARYQUESTIONS	
1	**If f : Q → Q is given by f(x) = x^2 , then find $f^{-1}(16)$.**	4
2	Consider the function f: R→*R*defined by f(x)= 2x+5, another function g(x)=(x-5)/2 Prove that g is inverse of f.	4

REFERENCES

TEXTBOOKS:

Authors	BookTitle	Publisher/Press	Edition &Year ofPublication
B.Kolman, R.C.Busby,and S.C.Ross	DiscreteMathematical Structures	5/e,PrenticeHall	2004.
E.R.Scheinerman,	Discrete Mathematics,	Brooks/Cole	2000.
Liptschutz, Seymour	DiscreteMathematics	McGrawHill.	2015

ONLINE/DIGITALREFERENCES: