Shirpur Education Society's
R. C. PATEL INSTITUTE OF TECHNOLOGY, SHIRPUR
An Autonomous Institute
(Affiliated to Dr. Babasaheb Ambedkar Technological University, Lonere)
आर. सी. पटेल इन्स्टिट्यूट ऑफ टेक्नॉलॉजी, शिरपूर
(स्वायत्त महाविद्यालय)

A.Y.-2021-22 – S.Y. B. Tech –Computer Engineering	
ODD SEMSTER (SEM- III)	
Subject- DBMS	Sub Code- PCCO3040T
Day & Date- Tuesday 21/12/2021	Time-4.00 to 5.15 PM
Term Test – I - Max Marks-30	

Note- Solve any 03 out of 04

Q. N.	Question	Marks
1 –a	What is data independence? Explain its types with diagram.	05
1 - b	Explain Aggregation with example.	05
2 –a	Draw neat and clean DBMS system architecture.	04
2 –b	Differentiate between strong and weak entity sets.	06
3	Explain the features of EER model.	10
4 –a	Based on which criterion how higher level entity becomes the part of lower level entity set in specialization? Explain.	06
4 - b	Explain the roles of database administrator.	04

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A.Y.-2021-22 – S. Y. B. Tech – Computer Engineering	
ODD SEMSTER (SEM-III)	
Subject- Digital Electronics	Sub Code- ESC03050T
Day & Date- Wednesday 22/12/2021	Time-10.45 to 12.00 PM
Term Test – I - Max Marks-30	

Note- Solve any 03 out of 04

Q. N.	Question	Marks
1	Perform following hexadecimal subtractions using 15's complement method. a. $(B01)_{16} - (98F)_{16}$ b. $(69A)_{16} - (C13)_{16}$	10
2	Explain Subtractor circuit in details.	10
3	a. Simplify following using Kmap implement using logic gates. $F = \sum (1, 2, 4, 7, 8, 11, 13, 14)$	05
	b. Simplify using Kmap and implement using logic gates. $F = A B C \bar{D} + \bar{B} \bar{C} + \bar{B} D + A B \bar{C} \bar{D} + \bar{B} C$	05
4	a. Simplify following using Boolean algebra and implement simplified expression using logic gates. $Y = \bar{A} \bar{B} C + \bar{A} B \bar{C} + A B C + A \bar{B} \bar{C}$	05
	b. Convert following 1. Find equivalent Hex for Decimal number 65535. 2. Find equivalent Decimal for Hex number 07E5.	05

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A.Y.-2021-22 – S. Y. B. Tech – Computer Engineering	
ODD SEMSTER (SEM- III)	
Subject-Discrete Structures	Sub Code-PCCO3030T
Day & Date- Tuesday 21/12/2021	Time- 10.45 to 12.00 PM
Term Test – I - Max Marks-30	

Note- Solve any 03 out of 04

Q. N.	Question	Marks
1	**a)** Solve following i. If A = {1, 2, 3, 4}, B = {3, 4, 5, 6}, C = {5, 6, 7, 8}. Find A ∪ B ∪ C. ii. If A = {3, 5, 7, 9, 11}, B = {7, 9, 11, 13}, C = {11, 13, 15}. Find A ∩ (B ∪ C). iii. If A = {1, 2, 3, 4, 5, 6}, B = {2, 4, 6, 8}. Find A – B and B – A. iv. If U = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10} and A = {1, 3, 5, 7, 9}. Find A′. v. Write the set A = {1, 4, 9, 16, 25 . . .} in set-builder form.	05
	b) In class of 105 students out of three subjects Maths, Physics, Chemistry each student studies at least one subject. In Maths 47, in Physics 50, and in Chemistry 52 students studies, 16 in Maths and Physics, 17 in Maths and Chemistry and 16 in Physics and Chemistry students both subjects. i. Find the number of students who studies all three subjects together. ii. What will be the number of those students who study **only two** subjects Maths and Physics? iii. What will be the number of those students who study **only two** subjects Maths and Chemistry? iv. What will be the number of those students who study **only two** subjects Physics and Chemistry?	05

2	**a)** Using truth tables- i. Show that $(P \rightarrow Q) \vee (Q \rightarrow P)$ is a tautology. ii. Show that $P \rightarrow Q$ and $\neg(P \vee Q)$ are logically equivalent	**05**
	b) Define following relations with example- i. Irreflexive Relation ii. Inverse Relation iii. Symmetric Relation iv. Asymmetric Relation v. Anti-symmetric Relation	**05**
3	**a)** What is Equivalence relation? Show that relation- $R = \{(1, 1), (1, 3), (2, 2), (2, 4), (3, 1), (3, 3), (4, 2), (4, 4)\}$ on set $A = \{1, 2, 3, 4\}$ is an Equivalence Relation.	**05**
	b) What is Partial Order relation? Show that relation- $R = \{(2, 1), (3, 1), (3, 2), (4, 1), (4, 2), (4, 3), (1, 1), (2, 2), (3, 3), (4, 4)\}$ on set $A = \{1, 2, 3, 4\}$ is Partial Order Relation.	**05**
4	Define Reflexive closure, Symmetric closure and Transitive closure of relations. Set S= {a, b, c, d), given as R = {(a, b),(b, d), (d, a) , (d, c)} Find transitive closure using Warshall's Algorithm.	**10**

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A.Y.-2021-22 – S. Y. B. Tech – Computer Engineering	
ODD SEMSTER (SEM- III)	
Subject- Engineering Mathematics-III	Sub Code-BSCO3010T
Day & Date- Monday 20/12/2021	Time- 10.45 to 12.00 PM
Term Test – I - Max Marks-30	

Note- Solve any 03 out of 04

Q. N.		Question	Marks
1	a	Using Laplace transform , evaluate $\int_0^{\infty} e^{-t}\, sinh2t\, sin3t\, dt$	05
	b	Find $L\left\{e^{-4t}\int_0^t u\, sin3u\, du\right\}$	05
2	a	By Using Partial Fraction , find Inverse Laplace transform of $\frac{3s+1}{(s-1)(s^2+1)}$	05
	b	By using convolution theorem , find Inverse Laplace transform of $\frac{s}{(s^2-a^2)^2}$	05
3	a	Solve $\frac{d^2y}{dx^2}+2\frac{dy}{dt}+5y=e^{-t}\, sint\, , y(0)=0\, , y'(0)=1$	05
	b	Find $L\{sin2t\, cost\, coh2t\}$	05
4	a	Find $L^{-1}\left\{\frac{1}{s}\, log\left(1+\frac{1}{s^2}\right)\right\}$	05
	b	Find $L\{Sin^5 t\}$	05

2	**a)** Using truth tables- i. Show that $(P \rightarrow Q) \vee (Q \rightarrow P)$ is a tautology. ii. Show that $P \rightarrow Q$ and $\neg P \vee Q$ are logically equivalent	**05**
	b) Define following relations with example- i. Irreflexive Relation ii. Inverse Relation iii. Symmetric Relation iv. Asymmetric Relation v. Anti-symmetric Relation	**05**
3	**a)** What is Equivalence relation? Show that relation- R = {(1, 1), (1, 3), (2, 2), (2, 4), (3, 1), (3, 3), (4, 2), (4, 4)} on set A = {1, 2, 3, 4} is an Equivalence Relation.	**05**
	b) What is Partial Order relation? Show that relation- R= {(2, 1), (3, 1), (3, 2), (4, 1), (4, 2), (4, 3), (1, 1), (2, 2), (3, 3), (4, 4)} on set A = {1, 2, 3, 4} is Partial Order Relation.	**05**
4	Define Reflexive closure, Symmetric closure and Transitive closure of relations. Set S= {a, b, c, d), given as R = {(a, b),(b, d), (d, a) , (d, c)} Find transitive closure using Warshall's Algorithm.	**10**

Term Test – I - Max Marks-30

Note- Solve any 03 out of 04

Q. N.	Question	Marks
1 –a	Write Linear Search Algorithm. Explain it with suitable example and time complexity analysis.	05
1 - b	Write Binary Search Algorithm. Explain it with suitable example and time complexity analysis.	05
2	Write algorithm for Quick sort. Explain stepwise complete working of it. Justify the same with following example and time complexity analysis. 44, 33, 11 , 55, 77, 90, 40, 60, 99, 22, 88, 66	10
3 –a	Explain Selection Sort algorithm with suitable example.	05
3 - b	Explain Insertion Sort algorithm with suitable example.	05
4	Compare Array and Linked List Data Structure(Pointwise).Draw linked list for following 5 nodes(10,20,30,40,50). Write the node structure for the same. Write algorithm for traversal and searching through this linked list.	10