Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS
CONTINUOUS ASSESSMENT TEST - II
WINTER SEMESTER 2025-2026

SLOT: A2+TA2

Programme Name & Branch	**: B.Tech [IT]**
Course Code and Course Name	**: BITE302L – Database Systems**
Faculty Name(s)	**: Prof. Bimal Kumar Ray, Prof. Jayaram Reddy A, Prof. Tappan Kumar Das, Prof. J. Karthikeyan**
Class Number(s)	**: VL2025260502761, 2763, 2766, 2768**
Date of Examination	**: 15-03-2026**
Exam Duration	**: 90 minutes**

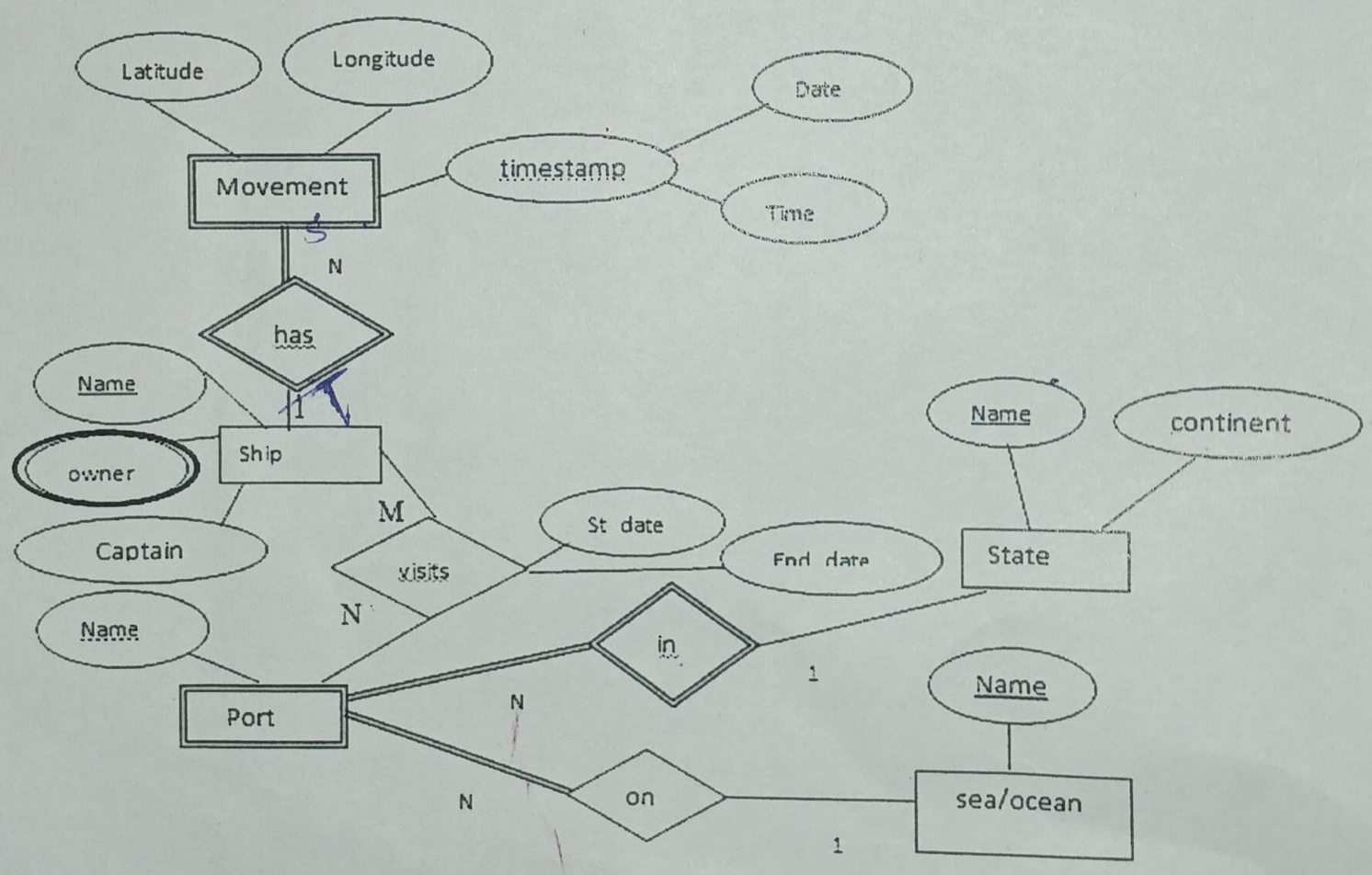
Maximum Marks: 50

General instruction(s):

- Answer All Questions
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)

Course Outcome:

3. Convert high-level conceptual model to a relational data model and to improve the database design by normalization.
4. Populate and query a database using SQL and PL/SQL. Also apply Query Processing and Indexing techniques to optimize the database system performance.

Q. No	Question	M	CO	BL
1.	Map the following ER schema into a relational schema. 	10	CO 3	BL 3
2.	With the following relational schema, write the **RELATIONAL ALGEBRAIC** expression. (each 2.5 marks) Parent(**PARENT_ID**, Parent_name, Address, mobile) Child(**CHILD_ID**, Child_name, Gender, DOB, Parent_ID) Session(**SESSIONID**, SessionDay, starttime,Price) Register(**REGISTERDATE, CHILDID,SESSIONID**, Grade)	10	CO 3	BL 3

REG.NO.:

VIT

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	i. Retrieve the number of children in each session. ii. Retrieve the total amount of the sessions that are registered by the Child whose ID is 101. iii. Find the names of the students and their parents who registered in the session that cost more than 2000. iv. Find the names of the students who registered for all the sessions.			
3.	a. Consider a relation schema R(P,Q,R,S,T,U,V,W,X) and the set of functional dependencies $\mathcal{F}$ ={P→Q, Q→R, PR→S, R→S, TU→V, W→T, W→X, WT→X, PQ→R}. Find a minimal cover of $\mathcal{F}$. (5 marks) b. Consider the relation R (M, Y, P, X, C, D, E, F) and the set of functional dependencies $\mathcal{F}$ = {M → X; MY →P; X → C; C→D; DE→F}. Identify whether decomposition $\mathcal{D}$ = {R_1 (M, Y, P, C), R_2 (M, X, C), R_3 (C, D, E, F)} is lossless or not? (5 marks)	10	CO 3	BL 3
4.	Suppose that R (A, B, C, D, E, F, G, H, I) is a relational schema with functional dependencies F = {AB → C; B→D,E; A→F; C→G; C→A; H→I}. Is this schema in BCNF? If not, normalize this relation till BCNF.	10	CO 3	BL 4
5.	Write **SQL Queries** for the following. (Each 2 marks) **Student (Regno,** Name, Dob, CGPA, Programme, Schoolname) **School (Schoolname,** Dean_Name) **Course (Code,** Title, Credit, Type) **Registered (Regno, Code,** Venue, Slot) a) List the codes of courses in which at least one student is registered. b) Find the course code in which more than 2 students registered. c) List the titles of courses which no student has registered in. d) List the Student name, Dob, Dean, and the registered course title of the students who belong to Programme 'IT' and were born after 01st January 2008. e) Find the student details who registered for the courses that have the highest credits.	10	CO 4	BL 3

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