

NATIONAL PRACTICAL EXAM PREPARATION FOR TECHNICAL SECONDARY SCHOOLS (TSS)

SCHOOL YEAR 2025-2026

SUMMATIVE/INTEGRATED ASSESSMENT

SECTOR: ICT AND MULTIMEDIA

TRADE: SOFTWARE DEVELOPMENT

Integrated Assessment Project: Develop a web application using Node JS, React JS and MySQL/MongoDB

1. INTEGRATED SITUATION

StockHub Ltd is a company located in Kigali City, Rwanda. It provides wholesale and retail product distribution services. The company is struggling with inefficiencies due to its manual, paper based system for managing stock movement and inventory records. The store manager records product details characterized by product code, product name, category, quantity in stock, unit price, supplier name and date received. The company also records warehouse information characterized by warehouse code, warehouse name and warehouse location. Based on the warehouse data, the store manager manually tracks stock in and stock out activities characterized by transaction date, quantity moved and transaction type. This process is slow, prone to errors and makes it difficult to monitor stock availability and generate inventory reports efficiently. To address these challenges, the StockHub Ltd needs a web based application that handles the stock management process. The system should allow the store manager to record stock details digitally and automatically generate needed reports.

Task: Stock Management System (SMS)

As a full stack developer, you are given 6 hours to develop that web based application by:

1. Using attributes provided below, design an Entity Relationship Diagram (ERD) that represents the relationship between their entities.

- Identify appropriate primary keys and foreign keys based on the relationships among the entities.
 - Entities and attributes are:
 1. Product (productCode, productName, category, quantityInStock, unitPrice, supplierName, dateReceived)
 2. Warehouse (warehouseCode, warehouseName, warehouseLocation)
 3. StockTransaction (transactionDate, quantityMoved, transactionType)
 - ERD should be drawn before using the computer.
 - ERD should be drawn on plain paper using pencils and then draw it in one of softwares using computer EX: using Edraw Max, lucidchart, draw.io, etc.
 - ERD should indicate cardinalities, relationships with correct symbols.
 - 2. Creating database called SMS with Product, Warehouse and StockTransaction tables as designed in ERD.
 - 3. Saving your work using your real names in a folder called **(FirstName_LastName_National_Practical_Exam_2026)**.
 - 4. Preparing React.js Front-end application development environment by installing required modules and dependencies.
 - 5. Preparing JavaScript runtime environment for Node.js.
 - 6. Creating React.js components with UI features that will enable users to input data into the tables above and display required reports.
- Menu bar/Pages of the web application should include Product, warehouse, Transactions, Reports and Logout options.
- The web application should be responsive.
7. Creating React.js components with UI features that will enable users to input data into the tables above and display required reports.
 8. Developing backend and frontend of Stock Management System.
- Name backend project folder as **backend-project** and frontend project folder as **frontend-project**.

➤ Use Tailwind CSS to implement UI design.

➤ Your backend application should communicate with MySQL database/MongoDB to perform CRUD operations using Node.js runtime environment and Express.js framework.

Note:

1. Insert operation should be used on all three (3) forms (Product, Warehouse and transactions).
2. Delete, update and retrieve operations should only be used on transactions form.
3. Creating React.js components with UI features that will enable users to input data into the tables above and display required reports.
4. Create a user account having username and password.
5. Integrating your React.js application to backend application using axios library.
6. Generating daily, weekly and monthly reports for available stock, stock in and stock out.

.....**END**.....

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2. INTEGRATED SITUATION

SalesPro Ltd is a company located in Huye District, southern province of Rwanda. It provides electronic equipment sales services. The company is facing challenges due to its manual system for recording daily sales transactions. The sales department records customer details characterized by customer number, first name, last name, telephone and address. Products sold are characterized by product code, product name, quantity sold and unit price. The company also records sales information characterized by invoice number, sales date, payment method and total amount paid. This process is time consuming, prone to errors and makes it difficult to generate daily, weekly and monthly sales reports efficiently. To address these challenges, the SalesPro Ltd needs a web based application that handles the sales recording process. The system should allow sales officers to record sales details digitally and automatically generate needed reports.

Task: Sales Record Management System (SRMS)

As a full stack developer, you are given 6 hours to develop that web based application by:

1. Using attributes provided below, design an Entity Relationship Diagram (ERD) that represents the relationship between their entities.
 - Identify appropriate primary keys and foreign keys based on the relationships among the entities.

- Entities and attributes are:
 1. Customer (customerNumber, firstName, lastName, telephone, address)
 2. Product (productCode, productName, quantitySold, unitPrice)
 3. Sale (invoiceNumber, salesDate, paymentMethod, totalAmountPaid)
 - ERD should be drawn before using the computer.
 - ERD should be drawn on plain paper using pencils and then draw it in one of softwares using computer EX: using Edraw Max, lucidchart, draw.io, etc.
 - ERD should indicate cardinalities, relationships with correct symbols.
 - 2. Creating database called SRMS with Customer, Product and Sale tables as designed in ERD.
 - 3. Saving your work using your real names in a folder called **(FirstName_LastName_National_Practical_Exam_2026)**.
 - 4. Preparing React.js Front-end application development environment by installing required modules and dependencies.
 - 5. Preparing JavaScript runtime environment for Node.js.
 - 6. Creating React.js components with UI features that will enable users to input data into the tables above and display required reports.
- Menu bar/Pages of the web application should include customer, product, Sales, Reports and Logout options.
- The web application should be responsive.
7. Creating React.js components with UI features that will enable users to input data into the tables above and display required reports.
 8. Developing backend and frontend of Sales Record Management System.
- Name backend project folder as **backend-project** and frontend project folder as **frontend-project**.
- Use Tailwind CSS to implement UI design.

➤ Your backend application should communicate with MySQL database/MongoDB to perform CRUD operations using Node.js runtime environment and Express.js framework.

Note:

1. Insert operation should be used on all three (3) forms (customer, product and Sales).
2. Delete, update and retrieve operations should only be used on Sales form.
3. Creating React.js components with UI features that will enable users to input data into the tables above and display required reports.
4. Create a user account having username and password.
5. Integrating your React.js application to backend application using axios library.
6. Generating daily, weekly and monthly reports for available customer, product and sales.

.....**END**.....

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3. INTEGRATED SITUATION

SupplyNet Ltd is a company located in Musanze District, northern province of Rwanda. It provides supply chain and logistics services. The company is experiencing inefficiencies due to its manual system for tracking suppliers, shipments and deliveries. The procurement office records supplier details characterized by supplier code, supplier name, telephone, address and email. Shipment details are characterized by shipment number, shipment date, shipment status and destination. The company also records product delivery information characterized by delivery code, delivery date, quantity delivered and delivery status. This process is slow, prone to errors and makes it difficult to monitor shipment progress and generate supply chain reports efficiently. To address these challenges, the SupplyNet Ltd needs a web based application that handles the supply chain management process. The system should allow procurement officers to record supplier and shipment details digitally and automatically generate needed reports.

Task: Supply Chain Management System (SCMS)

As a full stack developer, you are given 6 hours to develop that web based application by:

1. Using attributes provided below, design an Entity Relationship Diagram (ERD) that represents the relationship between their entities.

- Identify appropriate primary keys and foreign keys based on the relationships among the entities.
 - Entities and attributes are:
 1. Supplier (supplierCode, supplierName, telephone, address, email)
 2. Shipment (shipmentNumber, shipmentDate, shipmentStatus, destination)
 3. Delivery (deliveryCode, deliveryDate, quantityDelivered, deliveryStatus)
 - ERD should be drawn before using the computer.
 - ERD should be drawn on plain paper using pencils and then draw it in one of softwares using computer EX: using Edraw Max, lucidchart, draw.io, etc.
 - ERD should indicate cardinalities, relationships with correct symbols.
2. Creating database called SCMS with Supplier, Shipment and Delivery tables as designed in ERD.
 3. Saving your work using your real names in a folder called **(FirstName_LastName_National_Practical_Exam_2026)**.
 4. Preparing React.js Front-end application development environment by installing required modules and dependencies.
 5. Preparing JavaScript runtime environment for Node.js.
 6. Creating React.js components with UI features that will enable users to input data into the tables above and display required reports.
- Menu bar/Pages of the web application should include supplier, shipment, delivery, Reports and Logout options.
- The web application should be responsive.
7. Creating React.js components with UI features that will enable users to input data into the tables above and display required reports.
 8. Developing backend and frontend of Supply Chain Management System.
- Name backend project folder as **backend-project** and frontend project folder as **frontend-project**.

- Use Tailwind CSS to implement UI design.
- Your backend application should communicate with MySQL database/MongoDB to perform CRUD operations using Node.js runtime environment and Express.js framework.

Note:

1. Insert operation should be used on all three (3) forms (supplier, shipment and delivery).
2. Delete, update and retrieve operations should only be used on delivery or shipment form.
3. Creating React.js components with UI features that will enable users to input data into the tables above and display required reports.
4. Create a user account having username and password.
5. Integrating your React.js application to backend application using axios library.
6. Generating daily, weekly and monthly reports for available supplier, shipment and delivery.

.....**END**.....

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4. INTEGRATED SITUATION

PayMaster Ltd is a company located in Rubavu District, western province of Rwanda. It provides transportation and logistics services. The company is struggling with inefficiencies due to its manual payroll processing system. The human resource department records employee details characterized by employee number, first name, last name, address, position, telephone, gender and hired date. The company also records department details characterized by department code and department name. Based on department data, the human resource department manually prepares payroll characterized by gross salary, total deduction, net salary and month of payment. This process is slow, prone to errors and makes it difficult to process employee payments and generate payroll reports efficiently. To address these challenges, the PayMaster Ltd needs a web based application that handles the employee payroll management process. The system should allow the human resource department to record employee details digitally and automatically generate needed reports.

Task: Employee Payroll Management System (EPMS)

As a full stack developer, you are given 7 hours to develop that web based application by:

1. Using attributes provided below, design an Entity Relationship Diagram (ERD) that represents the relationship between their entities.

- Identify appropriate primary keys and foreign keys based on the relationships among the entities.
 - Entities and attributes are:
 1. Employee (employeeNumber, firstName, lastName, address, position, telephone, gender, hiredDate)
 2. Department (departmentCode, departmentName)
 3. Salary (grossSalary, totalDeduction, netSalary, monthOfPayment)
 - ERD should be drawn before using the computer.
 - ERD should be drawn on plain paper using pencils and then draw it in one of softwares using computer EX: using Edraw Max, lucidchart, draw.io, etc.
 - ERD should indicate cardinalities, relationships with correct symbols.
 - 2. Creating database called EPMS with Employee, Department and Salary tables as designed in ERD.
 - 3. Saving your work using your real names in a folder called **(FirstName_LastName_National_Practical_Exam_2026)**.
 - 4. Preparing React.js Front-end application development environment by installing required modules and dependencies.
 - 5. Preparing JavaScript runtime environment for Node.js.
 - 6. Creating React.js components with UI features that will enable users to input data into the tables above and display required reports.
- Menu bar/Pages of the web application should include Employee, Department, Salary, Reports and Logout options.
- The web application should be responsive.
7. Creating React.js components with UI features that will enable users to input data into the tables above and display required reports.
 8. Developing backend and frontend of Employee Payroll Management System.
- Name backend project folder as **backend-project** and frontend project folder as **frontend-project**.

- Use Tailwind CSS to implement UI design.
- Your backend application should communicate with MySQL database/MongoDB to perform CRUD operations using Node.js runtime environment and Express.js framework.

Note:

1. Insert operation should be used on all three (3) forms (Employee, Department and Salary).
2. Delete, update and retrieve operations should only be used on Salary form.
3. Creating React.js components with UI features that will enable users to input data into the tables above and display required reports.
4. Create a user account having username and password.
5. Integrating your React.js application to backend application using axios library.
6. Generating daily, weekly and monthly reports for available Employee, department and salary.

.....**END**.....