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| Course: | **Mobile Application Development** | Date: 27/05/2025 |
| Course Code: | CSL 341 | Session: I |
| Faculty’s Name: | Muhammad Ahtesham Noor | Max Marks: 30 |
| Time Allowed: | 2 Hours | Total Pages: (2) |

**INSTRUCTIONS:**

1. This is closed book exam. Communication devices and any written material is strictly prohibited.
2. All questions are compulsory.

Student’s Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Enroll No:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(USE CAPITAL LETTERS)

**Q1: FastAPI Setup and Firebase Initialization (10 marks)**

* Set up a basic FastAPI app with a route /ping that returns "Server is live!".
* Integrate Firebase service account credentials.
* Create a route /firebase-check to test successful Firebase connection.

**Q2: OTP-based Login System (10 marks)**

* Create a route /send-otp that:
  + Accepts a phone number and returns a simulated 6-digit OTP (randomly generated).
  + Stores the OTP with timestamp in Firestore (use Firebase Admin SDK).
* Create a route /verify-otp that:
  + Accepts phone number and OTP.
  + Validates the OTP and checks if it has not expired (e.g., 5-minute expiry).
  + Returns a success or failure message.

**Q3: Firestore-based CRUD API for Students (10 marks)**

Build RESTful API endpoints to manage "students" with the following:

* POST /students: Add student data (name, email, age) to Firestore.
* GET /students: Retrieve all student records.
* GET /students/{id}: Retrieve a single student record by document ID.
* PUT /students/{id}: Update student details.
* DELETE /students/{id}: Delete a student record.

Return appropriate JSON responses and HTTP status codes. Test all endpoints using **Postman** or **cURL**.

**Best of Luck**