BANGLADESH TECHNICAL EDUCATION BOARD

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM

AUTOMOBILE TECHNOLOGY

SYLLABUS

THIRD SEMESTER

AUTOMOBILE TECHNOLOGY (62)

3rd Semester

Sl. No	Subject code	Name of the subject	T	P	C	MARKS				
						Theory		Practical		Total
						Cont. assess	Final exam.	Cont. assess	Final exam.	
1.	6231	Automotive Engine System-1	2	6	4	20	80	50	50	200
2.	6811	Basic Electronics	2	3	3	20	80	25	25	150
3.	6632	Computer-2	0	6	2	-	-	50	50	100
4.	5931	Math-3	3	3	4	30	120	50	-	200
5.	5922	Physics-2	3	3	4	30	120	25	25	200
6.	5811	Social Science-1	2	0	2	20	80	-	-	100
7.	5711	Bangla	2	2	3	20	80	50	-	150
		Total	**14**	**23**	**22**	**140**	**560**	**200**	**200**	**1100**

6231 AUTOMOTIVE ENGINE SYSTEM – I

T	P	C
2	6	4

OBJECTIVES

To provide the students with an opportunity to acquire knowledge and skills of automobile engines and their systems with special emphasis on :

- Automobile engine, dimensions.
- Automobile engine types.
- 2-stroke and 4-stroke engines.
- Petrol and diesel engines.
- V-type and opposed cylinder engines.
- Wankel engine
- Automobile gas turbine.
- Turbo charger and super charger.

SHORT DESCRIPTION

Heat engine and their types; Otto cycle engine, diesel cycle engine, 4-stroke S.I. and C.I. engine, 2-stroke S.I. and C.I. engines; Wankel engine; V-type and opposed cylinder engine; Automobile gas turbine; Engine performance; Super charger and turbo charger.

DETAIL DESCRIPTION

Theory :

ENGINE & ITS TYPES

1 Understand engine and its types.

1.1 Define heat engine.
1.2 Classify. heat engine.
1.3 Distinguish external & internal combustion engine.
1.4 Classify internal combustion (I.C) engine
1.5 Explain combustion process of fuel in I.C engine.

AUTOMOBIL ENGINE DIMENSIONS

2 Understand the terms and factors related to engine dimension.

2.1 Define bore, stroke, TDC, BDC, crank throw, clearance volume, swept volume, compression ratio etc.
2.2 Describe the process of determining compression ratio of an engine.
2.3 Define square engine.
2.4 Mention the advantages of square engine.

2.5 Solve problems on C.R. piston displacement and clearance volume.

STATIONARY ENGINE PARTS

3. Understand features of stationary engine parts.

3.1 Identify the stationary engine parts.
3.2 Describe the functions, constructions and materials of cylinder head, block & oil pan.
3.3 Distinguish mono block and individual block.
3.4 Describe the function, construction and types of cylinder liners.
3.5 Describe the function, construction and materials for exhaust and intake manifold.
3.6 Describe the function, construction, types and materials for bearing and valve guide
3.7 Describe the function & Constriction of engine gasket.

MOVING ENGINE PARTS

4. Understand features of moving engine parts.

4.1 Identify the moving engine parts.
4.2 Describe the functions, construction, types and material used for crankshaft, camshaft, engine valves, piston, piston rings, piston pins, connecting rod, timing gears, chain, belt and fly wheel.
4.3 Explain the advantage of piston made of alloy.

SPARK IGNITION ENGINE

5. Understand the concept of spark ignition (SI) engine

5.1 Describe 4-stroke of S.I. engine.
5.2 Interpret the 4-stroke events of S.I. engine with the p.v. diagram.
5.3 Explain the 4-stroke of petrol engine.
5.4 Describe 2-stroke cycle S.I. engine
5.5 Explain the operating principle of 2-stroke cycle S.I. engine.
5.6 Distinguish between 2-stroke cycle S.I. engine with 4-stroke cycle S.I. engine.

COMPRESSION IGNITION ENGINE

6. Understand the compression ignition (CI) engine.

6.1 Describe 4-strokes of C.I. engine.
6.2 Interpret the 4-stroke events of diesel engine with the p.v. diagram
6.3 Explain 4 strokes of diesel engine.
6.4 Describe 2-stroke cycle C.I engine.
6.5 Explain the operating principles of 2-stroke cycle C.I. engine.
6.6 Distinguish between 2-stroke cycle C.I. engine with 4-stroke cycle C.I. engine.

WANKEL ENGINE / ROTARY ENGINE

7 Understand the feature of wankel engine

7.1 Define wankel or rotary engine.
7.2 Draw wankel or rotary engine
7.3 Explain the working principles of operation of wankel or rotary engine.
7.4 Explain the advantages and disadvantages of wankel or rotary engine over conventional engine.

V-TYPE ENGINE

8 Understand the concept of V-type engine.

8.1 State the meaning of V-type engine.
8.2 Describe V-type engine.
8.3 Describe the working principle of V-type engine.
8.4 Explain the advantages and disadvantages of V-type engine over other engines.

OPPOSED CYLINDER ENGINE

9 Understand the features of opposed cylinder engine.

9.1 State the meaning of opposed cylinder engine.
9.2 Mention the type of opposed cylinder engine.
9.3 Describe the operation of opposed cylinder engine with sketch.
9.4 Mention the advantage of opposed cylinder engine over other conventional engine.

AUTOMOBILE GAS TURBINE

10 Understand the features of gas turbine.

10.1 Define gas turbine.
10.2 Describe the principles of operation of gas turbine.
10.3 Explain advantages and disadvantages of gas turbine with other automobile engine.

ENGINE EFFICIENCIES

11 Understand the concept of engine efficiencies

11.1 Explain volumetric efficiency, thermal efficiency & mechanical efficiency.
11.2 Solve problems relating to volumetric efficiency, thermal efficiency & mechanical efficiency

TURBO CHARGER AND SUPER CHARGER

12 Understand the features of turbo charger and super charger.

12.1 Define super charging.

12.2 Describe the principle and operation of a super charger.
12.3 Define turbo charging.
12.4 Describe principle and operation of a turbo charger.

PRACTICAL

1. Identify the general tools and equipment used in the automobile shop.
2. Identify stationery engine parts of an automobile engine.
3. Identify moving engine parts of an automobile engine.
4. Identify major components of S.I. engine and C.I. engine and differentiate them
5. Demonstrate the construction of cylinder head, cylinder block, oil pan and other stationary parts of engine.
6. Demonstrate the construction of piston and connecting rod assembly.
7. Demonstrate the construction of crank shaft
8. Demonstrate the construction of the bearings of an engine
9. Demonstrate the construction of the cam shaft and timing gears, chain or belt.
10. Demonstrate the operation of a 4-stroke cycle petrol engine with the help of a model
11. Demonstrate the operation of a 2-stroke cycle petrol engine with the help of a model
12. Demonstrate the operation of a 2-stroke cycle diesel engine with the help of a model
13. Demonstrate the operation of a 4-stroke cycle diesel engine with the help of a model
14. Demonstrate typical V-type engine.
15. Demonstrate typical horizontal opposed piston engine.
16. Inspect gas turbine (observe different components).
17 Measure bore, stroke and swept volume of an engine cylinder.
18. Measure Compression ratio of an engine Cylinder.

REFERENCE BOOKS

1) Auto Mechanics Fundamentals- Martin W. Stockel & Martin T.Stokel –(Goodheart willcoks publisher)
2) Automobile Engineering - R.B Gupta . (Khanna pablisher)
3) Automobile Technology- N.K Giri (Khanna pablisher)
4) Automobile Engineering - K.K Ramalingam (Sci Tech publication)
5) Automobile Engineering -Dr. Kripal Singh (Standers publication)
6) The Automobile – Harbans Singh Reyat (S. Chand publication)

6811	BASIC ELECTRONICS	T	P	C
		2	3	3

OBJECTIVES

- To provide understanding soldering technique and color code.
- To provide understanding and skill on the basic concept of semiconductor and to identify physically a range of semiconductor diodes.
- To develop comprehensive knowledge and skill on special diodes and devices.
- To develop the abilities to construct different rectifier circuits.
- To provide understanding of the basic concept and principle of transistor and to identify physically a range of transistor.
- To provide understanding and skill on the basic concept of logic gates.
- To provide the understanding skill on using Electronic measuring and testing equipment.

SHORT DESCRIPTION

Color code and soldering; Semiconductor; P-N junction diode; Special diodes and devices; Power supply; Transistor; Transistor amplifier; Logic gates Electronic measuring and test equipment.

DETAIL DESCRIPTION

Theory:

1 Understand the Concept of soldering and Color Code.

1.1 Define soldering.
1.2 Describe the different types of solder.
1.3 List the things needed in soldering.
1.4 Mention the properties of a good soldered joint.
1.5 Describe the functions and construction of (i) Single sided, (ii). Double sided & (III) Multi layered Printed circuit board.
1.6 Mention the function of resistor, capacitor and inductor in electronic circuits.
1.7 Describe the procedure of determining the value of Capacitor, & Resistor using numeric and color code.

2 Understand the Concept of Semiconductor.

2.1 Define Conductor, Semiconductor and Insulator.
2.2 Describe Semiconductor with atomic structure.
2.3 Describe the effect of temperature on conductivity of Semiconductor.
2.4 Explain the energy band diagram of Conductor, Semiconductor and Insulator.
2.5 Classify Semiconductor.
2.6 Describe the generation & recombination of hole and electron in Intrinsic Semiconductor.
2.7 Define doping, P-type & N-Type material, covalent bond, majority & minority charge carrier.
2.8 Explain the characteristics of Carbon, Gallium Arsenide/Phosphide.

3 Understand the Concept of P-N Junction Diode

3.1 Define PN junction diode
3.2 Describe the formation of depletion layer in PN junction.
3.3 Discuss potential barrier, drift & diffusion current and their physical significance.
3.4 Mention the behavior of PN junction under forward and reverse bias.
3.5 Explain the forward & reverse current voltage (IV) characteristics of PN junction diode.
3.6 Explain the effect of temperature Si & Ge diode characteristics
3.7 Define (i) static resistance (II) Dynamic resistance, (III forward breakdown voltage and (II) Reverse break down voltage.
3.8 Draw the equivalent circuit of PN junction diode.
3.9 Describe the specification of diode.

4 Understand the DC power supplies.

4.1 Define dc power supply.
4.2 Mention the importance of dc power supply.
4.3 Define rectification and rectifier.
4.4 Explain the operation of Half wave, Full wave and Bridge rectifier.
4.5 Discuss ripple factor & efficiency and TUF of Half wave, Full wave and Bridge rectifier.
4.6 Explain the operation of different types filter circuits with wave shape.
4.7 Define regulated and unregulated power supply.
4.8 Describe the block diagram of a typical regulated dc power supply.

5 Understand the Concepts of Special diode.

5.1 Define Zener break down.
5.2 Describe the operation of Zener diode.
5.3 Explain IV characteristics of Zener diode.
5.4 Describe the application of Zener diode in (i) voltage stabilization, (ii) meter protection and (II) peck clipper circuits.
5.5 Describe the construction operation and application of (I) Tunnel diode (II) varactor diode (III) Schottky diode (iv) Step-Recovery diode (v) PIN diode, (vi) LED (vii) LCD (viii) photo diode (ix) Solar cell.
5.6 Describe the construction operation and application of (i) DIAC (ii) TRIAC and (iii) SCR.

6 Understand the construction and operation of Bipolar Junction Transistor (BJT)

6.1 Define Transistor.
6.2 Describe the construction PNP and NPN Transistor.
6.3 State the biasing rules of BJT.
6.4 Explain the mechanism of current flow of PNP and NPN Transistor.
6.5 Establish the relation among Base, Emitter and Collector current ($I_E = I_C + I_B$)
6.6 Draw the three basic transistor configuration circuits (CB, CC, CE).
6.7 Describe current amplification factor α , β and γ.
6.8 Establish the relation among α , β and γ.
6.9 Solve problem related to I_E, I_C, I_B, α , β and γ.

7 Understand the concept of BJT Amplifier

7.1 Define (i) Amplifier (ii) Amplification and (III) Gain
7.2 Mention the classification of Amplifier.
7.3 Describe the principle of operation of a common emitter (CE) Amplifier.
7.4 Draw DC & AC equivalent circuits of the CE amplifier circuit.
7.5 Mention the formula of (i) input resistance (ii) Output Resistance (iii) Current gain (iv) Voltage gain and (v) power gain.
7.6 Solve problem related to different gain resistance.

8 Understand the main feature of digital electronics

8.1 Describe the difference between analog and digital signal.
8.2 State the advantage of digital system.
8.3 Define logic gate.
8.4 Describe the basic operation of logic gates AND, OR, NOT NAND, NOR, XOR & XNOR.
8.5 Prepare truth table of logic gates AND, OR, NOT NAND, NOR, XOR & XNOR.

9 Understand the Electronic measuring and testing equipment

9.1 Define AVO meter.
9.2 Describe the procedure of measuring current, voltage and resistance using AVO meter.
9.3 List the control knobs of Oscilloscope.
9.4 Explain the procedure of measuring frequency and voltage using Oscilloscope.
9.5 Mention the function of (i) Function Generator (ii) Logic Probe (iii) Semiconductor Tester.

Practical :

1 Show skill in identifying the electronic components.

1.1 Observe the electronic components board and read the manuals.
1.2 Identify the different types of resistors with their values, tolerance and wattage.
1.3 Identify the different types of potentiometers with their values, & wattage.
1.4 Identify the different types of capacitors with their values, dc working voltages and types.
1.5 Identify the different types of diodes & rectifiers with the numbers and specifications.
1.6 Identify the different types of transistors and thyristors with their number and specifications.
1.7 Identify the different types of LED's, IC's and miniature relays with their number & specification.
1.8 Identify different types of transformer with their specification.
1.9 Identify different inductors with their values & current ratings.
1.10 Study the printed circuit boards.
1.11 Sketch the symbols of components used in electronic circuits.
1.12 Describe the basic function of each component.
1.13 Write a report on above activities.

2 Show skill in electrical measurement.

2.1 Perform simple voltage and current measurements on basic series and parallel resistor circuits using the following instruments.
- a) Voltmeters and ammeters
- b) AVO meters
- c) Digital multimeter
- d) Basic CRO

3 Show skill for determining the values of different resistors and capacitors with the help of color code.

3.1 Select color code resistors & capacitors of different values.
3.2 Identify the colors and their numerical numbers.
3.3 Determine the value of resistors with tolerance.
3.4 Determine the value of capacitors and dc working voltage.
3.5 Write a report on above activities.

4 Show skill in performing soldering.

4.1 Select wires (single strand and multi strand) and cut wires to required length.
4.2 Select soldering iron, soldering tag and soldering lead.
4.3 Remove wire insulation to required length.
4.4 Clean and tin both iron and work piece.
4.5 Use a tinned iron in order to transfer adequate heat to the joint.
4.6 Joint two singles stranded wires mechanically and solder.
4.7 Joint two multi-strand wires mechanically and solder.
4.8 Perform soldering exercise for making three dimensional wire frame.
4.9 Sketch and write a report on the job.

5 Show skill in soldering & desoldering of electronic components and wires to the other components and circuit boards.

5.1 Select electronic components, wires and PCB.
5.2 Determine the rating of the soldering iron suitable for the work piece.
5.3 Clean and tin both iron & work piece.
5.4 Feed new soldering materials to the tinned and heated joint, in order to produce a correctly soldering.
5.5 Check the quality of soldering.
5.6 Clean and tin iron and de-solder the joint and components.
5.7 Use solder suckers and solder braid for de-soldering.
5.8 Write a report on the Job.

6 Show skill in checking the semi-conductor diode.

6.1 Collect a range of semi-conductor diodes and manufactures literature.
6.2 Select the digital multimeter and set the selector switch to ohm range.
6.3 Determine the specification of semi-conductor diode.
6.4 Compare the determined specification with that of manufactures literature.
6.5 Measure forward & reverse resistances of the diode.
6.6 Identify p and p side of the diode.
6.7 Determine the condition of the diode.

7 Show skill in sketching forward and reverse characteristics curves of a semiconductor diode.

7.1 Select meter, power supply, components and materials.
7.2 Complete circuit according to circuit diagram for forward bias.
7.3 Check all connections.
7.4 Measure forward bias and corresponding forward current.
7.5 Record results in tabular form.
7.6 Connect circuit according to circuit diagram of reverse bias.
7.7 Measure reverse bias and corresponding reverse current.
7.8 Record results in tabular form.
7.9 Sketch the curves form data.

8 Show skill in sketching waves of half wave rectifier circuit.

8.1 Select meter, component, oscilloscope and materials.
8.2 Complete circuit of a half wave rectifier according to circuit diagram.
8.3 Check the circuit before operation.
8.4 Measure the input and output voltage and observe wave shapes in the oscilloscope.
8.5 Sketch the output voltage wave shape.

9 Show skill in sketching waves of full wave center tapped rectifier circuit.

9.1 Select meter, component, oscilloscope and materials.
9.2 Complete a full wave rectifier circuit according to circuit diagram.
9.3 Check the circuit supply & polarity of supply.
9.4 Measure the input & output voltages and observe wave shapes in the oscilloscope.
9.5 Sketch the output voltage wave shape.
9.6 Compare the result with half-wave rectifier circuit.

10 Show skill in constructing full wave bridge rectifier.

10.1 Select meter, component, oscilloscope and materials.
10.2 Build the circuit according to the circuit diagram.
10.3 Check the circuit.
10.4 Measure the input and output voltage.
10.5 Observe wave shape.
10.6 Compare the result with other rectifiers.

11 Show skill in identifying the bipolar junction transistor.

11.1 Select pnp & npn bipolar junction transistors.
11.2 Take DMM and manufacture's literature of transistor.
11.3 Identify transistor legs.
11.4 Measure base-emitter, base-collector, forward and reverse resistance.
11.5 Determine the specifications with help of manufacturer's literatures.
11.6 Identify pnp & npn transistor.

12 Show skill in determining input and output characteristics of a transistor in common emitter connection.

12.1 Select component, AVO meters, circuit board and required materials.
12.2 Construct the circuit.
12.3 Adjust the biasing voltage to appropriate point.
12.4 Record input and output voltage and current.
12.5 Plot the curve with recorded data.

13 Show skill in testing special diodes.

13.1 Select different types of special diodes.
13.2 Set the AVO meter in the ohm scale.
13.3 Measure resistances for each of two terminals.
13.4 Determine the condition (good and bad).
13.5 Determine the different terminals.

14 Verify the truth tables of different types of logic gates.

14.1 Select the specific gate.
14.2 Prepare the experimental circuit.
14.3 Adjust the power supply.
14.4 Verify the truth table.

REFERENCE BOOKS :

1. A Text Book of Applied Electronics - R.S. SEDHA
2. Principles of Electronics - V. K. Mehta
3. Basic Electronics (Solid Stater) - B. L. Theraja
4. Electronic Devices and Circuit Theory - ROBERT BOYLESTAD
   - LOUIS NASHELSKY

6632 Computer Application -II

T	P	C
0	6	2

OBJECTIVES

To develop skill on **S**preadsheet applications.
To develop skill on creating graphs.
To assist in the efficient use of database packages.
To develop skill on computerized database management.
To develop skill on programming with database management.

SHORT DESCRIPTION

Spreadsheet Analysis Package: Applications of spreadsheet; Using worksheet; Apply formula and functions in worksheet; Creating & printing graphs; Create simple macros.

Database management package: Creating the database; Editing the database; Searching the records; Customizing the data entry form; Creating the query; Arranging the records; Generating reports.

Database management language: Creating a command file; Writing simple database program using decision-making commands.

DETAIL DESCRIPTION

SPREAD SHEET ANALYSIS PACKAGE:

1 Apply the basic skills of a spreadsheet software package

1.1 Run a spreadsheet software package.
1.2 Identify and use different areas (working area, border area, control panel, mode indicator, and status indicator) of the worksheet screen.
1.3 Identify the function of different keys (typing key, calculator key, text key, cursor key, etc.)of the keyboard.
1.4 Move around the worksheet using keys and combination of key.
1.5 Identify and use the on-screen help facility.
1.6 Identify and use the types of data, numbers, labels and formula.
1.7 Demonstrate menus, submenus, pop-up menu, etc.

2 Manage workbooks and windows.

2.1 Make and use workbooks.
2.2 Access different types of files.
2.3 Open files as read only.
2.4 Demonstrate the options for saving files.
2.5 Display a workbook in more than one window.
2.6 Work with more one workbook.
2.7 Close a workbook.

3 Create a worksheet and use simple commands.

3.1 Activate entries in a worksheet.
3.2 Use edit key (F2) to correct or to modify entries.
3.3 Activate the command menus and select commands.
3.4 Save the worksheet.
3.5 Exit from spreadsheet .
3.6 Retrieve a previously saved worksheet.
3.7 Modify the worksheet.
3.8 Save a modified worksheet.

4 Apply formula, function and using templates.

4.1 Use simple formulae to solve arithmetical computation.
4.2 Use arithmetical operators in formula.
4.3 Edit formula.
4.4 Use mathematical function to solve simple equations.
4.5 Make and use workbook templates.
4.6 Make changes in existing workbook templates
4.7 Validate numbers, dates, times & text.
4.8 Show custom validation.

5 Solve engineering problems using formula and functions

5.1 Use mathematical functions to compute trigonometric values, absolute values, random number, square root, logarithmic values, etc for solving engineering problems.
5.2 Use logical functions to perform an operation depending on a condition in engineering problem.
5.3 Use statistical function to compute summation, average, minimum value, maximum value, etc in engineering problem.

6 Work with cell pointer to a particular cell.

6.1 Use GOTO key to move the cell pointer to particular cell.
6.2 Use the ABSOLUTE KEY to change cell address from one from to another in formula or in functions.
6.3 Enter range in formulae or in functions by typing directly or by using cell pointer.
6.4 Create a range name.
6.5 Use range name in formula & functions.
6.6 Copy, Move & Erase cell range.

7 Format a worksheet.

7.1 Change the width of a column, a range of column, and change the columns width globally.
7.2 Insert blank columns and blank rows in a worksheet.
7.3 Delete columns and blank rows in a worksheet.
7.4 Format the display of data of a worksheet globally or by referring a range of cells (e.g. currency format, exponential format, comma format, etc.).
7.5 Format the display of data and of a worksheet globally or referring of cells.
7.6 Protect worksheet, function, formula, important text and unprotect a range for entering entries.

7.7 Work with window for viewing worksheet in different ways and freeze rows or columns.
7.8 Create, change and delete a style.

8 Exercise on Sorting, Searching and Worksheet Printing.

8.1 Create a database program
8.2 Sort a database in different ways.
8.3 Search a record from the database using search criteria.
8.4 Extract records from the database that match a given criteria.
8.5 Delete records that a given criteria from the database using available database commands.
8.6 Show the Print Preview and adjust Page setup option.
8.7 Create and use page headers of footers.
8.8 Set print area, print titles and different print option
8.9 Print portion of worksheet and multiple worksheets
8.10 Print ranges from different worksheets on the same pages.

9 Create and Print graphs.

9.1 Create bar, line, X-Y and pie graphs.
9.2 Add color, titles, legend, gird and levels to the graph.
9.3 Add visual impact with colors.
9.4 Create linked pictures.
9.5 Save the graph and assign names to different graphs of a single worksheet.
9.6 Print graphs (low or high quality graphs.)
9.7 Plot graphs using a plotter using different colors.
9.8 Change graphs size, print & plot them.

10 Create Macros and using macro commands.

10.1 Create simple macros (e.g. to change the width of a cell, to format a cell display, to erase a range of cells etc.) using keystroke commands.
10.2 Create a macro to convert values into labels vice versa.
10.3 Create a macro for inserting blank rows between two rows of data in a worksheet.
10.4 Create a macro for deleting the inserted blank rows in a worksheet.

DATABASE MANAGEMENT PACKAGE:

11 Create the new database.

11.1 Identify the practical database in real world.
11.2 Identify the fields and records of a database.
11.3 Identify the different phases of database design.
11.4 Collect the data form a typical field.
11.5 Determine the category of a typical field.
11.6 Design a typical Paper- pencil database form raw data.
11.7 Run a generalized database management package and identify its display

Screen

11.8 Identify the different options of the selected packages.
11.9 Use the on-screen help facilities of DBMS package
11.10 Create and save the table structure.

12 Change the table structure and edit database.

12.1 Modify and Edit the table structure.
12.2 Verify the structure (i.e. data of update, number of records. etc)
12.3 Enter or append the new records in the database.
12.4 Use the key combinations for editing.
12.5 Use the available options to edit fields.
12.6 Delete unwanted records and files.
12.7 Save & close database file.
12.8 Use different modes to append and edit records of database.

13 Search, display and arrange the records of database.

13.1 View a database using list and display command
13.2 Retrieve the database records with different conditions.
13.3 Search within a field.
13.4 Keep the track of specific records.
13.5 Keep the database up-to-date.
13.6 Sort a database on single or multiple fields.
13.7 Sort with qualifier (i.e. sort with specific subset of records).
13.8 Index the database on single or multiple fields.
13.9 Use the function to index on different field types.
13.10 Use the commands for selective indexing and to control the order of records.

14 Create the customized data entry form.

14.1 Draw a typical data entry screen with paper-pencil work.
14.2 Design the screen with all fields.
14.3 Move the field to make the entry form logical and easy to use.
14.4 Change the field width.
14.5 Add or delete field (if necessary).
14.6 Change the display characteristics of fields.
14.7 Use picture functions template and range to format the displayed data.
14.8 Use different options and commands in design menu.
14.9 Draw lines and boxes on the form.

15 Create the query.

15.1 Display and identify query design screen.
15.2 Build a simple query
15.3 Save & apply the query.
15.4 Use the query design menu options.
15.5 Use the symbols and operators to build query.
15.6 Search the records with matching on two or more fields.
15.7 Select the records within range using range operators.
15.8 Find the records with inexact and complex matching.

15.9 Sort the records within queries.

16 Generate the custom reports.

16.1 Send the reports to the screen or to a file.
16.2 Use the print menu options and dos-prompt options.
16.3 Produce a quick and selective report.
16.4 Plan the design of the report.
16.5 Design a custom columnar report.
16.6 Find the parts of a report specification.
16.7 Make the changes to the report specification.
16.8 Save & run the report.

17 Work with multiple database and relationship.

17.1 Merge the data form one file to another.
17.2 View the files to relate two or more database files.
17.3 Set up the relationship.
17.4 Modify the relationship.
17.5 Create the report from relational database.

DATABASE MANAGEMENT LANGUAGE:

18 Create a simple command file using expression and function.

18.1 Identify the database editor.
18.2 Use the commands to assign different types of data values to variables.
18.3 Save the memory variable.
18.4 Display the memory variable.
18.5 Release & restore the memory variable.
18.6 Use the mathematical expression.
18.7 Use the mathematical, relational, logical and string operators.
18.8 Use the common function such as EOF, BOF DATE, UPPER & LOWER< CTOD, DTOS, SPACE, TRIM, STR, etc. in command file.
18.9 Use the commonly use commands such as SET TALK, SKIP, RETURN in command file.
18.10 Use the commands to display a string of characters and wait for user response.
18.11 Use commands to display or print text.

19 Design & write simple programs.

19.1 Identify the basic steps to design a program.
19.2 Write the pseudocode for simple program.
19.3 Convert the pseudocode into actual program code.
19.4 Verify & documents the simple program.
19.5 Save the command file and then exit.
19.6 Run the program.

20 Use the decision making commands in Programs.

20.1 Use DO WHILE ---- ENDDO, IF ---- ENDIF and DO CASE ---- ENDCASE to control program flow.
20.2 Use SCAN ---- ENDSCAN command instead of DO WHILE ---- ENDDO.

20.3 Use IF, ELSE and ENDIF commands to branch to the part the program.
20.4 Use nested IF ---- ENDIF statements.
20.5 Write simple program using decision making commands.
20.6 Use immediate IF function.
20.7 Write simple program using immediate IF function.
20.8 Use CASE ---- ENDCASE statement instead more than three IF ---- ENDIF statements.
20.9 Use the EXIT, CANCEL, WAIT and ZAP command in database program.
20.10 Use macro function within programs.

5931 MATHEMATICS – III T P C

3 3 4

AIMS

- To make understand the basic concept and techniques of composition and resolution of vectors and computing the resultant of vectors.
- To enable to use the knowledge of gradient of a straight line in finding speed, acceleration etc.
- To enable to use the knowledge of conic in finding the girder of a railway bridge, cable of a suspension bridge and maximum height of an arch.
- To provide ability to apply the knowledge of differential calculus in solving problem like slope, gradient of a curve, velocity, acceleration, rate of flow of liquid etc.
- To enable to apply the process of integration in solving practical problems like calculation of area of a regular figure in two dimensions and volume of regular solids of different shapes.

SHORT DESCRIPTION

Vector	**:** Addition and subtraction, dot and cross product.
Co-ordinate Geometry	**:** Co-ordinates of a point, locus and its equation, straight lines, circles and conic.
Differential Calculus	**:** Function and limit of a function, differentiation with the help of limit, differentiation of functions, geometrical interpretation of $\frac{dy}{dx}$, successive differentiation and Leibnitz theorem, partial differentiation.
Integral Calculus	**:** Fundamental integrals, integration by substitutions, integration by parts, integration by partial fraction, definite integrals.

DETAIL DESCRIPTION

Vector

1 Apply the theorems of vector algebra.

1.1 Define scalar and vector.

1.2 Explain null vector, free vector, like vector, equal vector, collinear vector, unit vector, position vector, addition and subtraction of vectors, linear combination, direction cosines and direction ratios, dependent and independent vectors, scalar fields and vector field.

1.3 Prove the laws of vector algebra.

1.4 Resolve a vector in space along three mutually perpendicular directions

1.5 solve problems involving addition and subtraction of vectors.

2 Apply the concept of dot product and cross product of vectors.

2.1 Define dot product and cross product of vectors.
2.2 Interpret dot product and cross product of vector geometrically.
2.3 Deduce the condition of parallelism and perpendicularity of two vectors.
2.4 Prove the distributive law of dot product and cross product of vector.
2.5 Explain the scalar triple product and vector triple product.
2.6 Solve problems involving dot product and cross product.

CO-ORDINATE GEOMETRY

3 Apply the concept of co-ordinates to find lengths and areas.

3.1 Explain the co-ordinates of a point.
3.2 State different types of co-ordinates of a point.
3.3 Find the distance between two points (x_1, y_1) and (x_2, y_2).
3.4 Find the co-ordinates of a point which divides the straight line joining two points in certain ratio.
3.5 Find the area of a triangle whose vertices are given.
3.6 Solve problems related to co-ordinates of points and distance formula.

4 Apply the concept of locus.

4.1 Define locus of a point.
4.2 Find the locus of a point.
4.3 Solve problems for finding locus of a point under certain conditions.

5 Apply the equation of straight lines in calculating various parameter.

5.1 Describe the equation x=a and y=b and slope of a straight line.
5.2 Find the slope of a straight line passing through two point (x_1, y_1) and (x_2, y_2).
5.3 Find the equation of straight lines:
  i) Point slope form.
  ii) Slope intercept form.
  iii) Two points form.
  iv) Intercept form.
  v) Perpendicular form.
5.4 Find the point of intersection of two given straight lines.
5.5 Find the angle between two given straight lines.
5.6 Find the condition of parallelism and perpendicularity of two given straight lines.
5.7 Find the distances of a point from a line.

6 Apply the equations of circle, tangent and normal in solving problems.

6.1 Define circle, center and radius .
6.2 Find the equation of a circle in the form:

i) $x^2 + y^2 = a^2$

ii) $(x - h)^2 + (y - k)^2 = a^2$

iii) $x^2 + y^2 + 2gx + 2fy + c=0$

6.3 Find the equation of a circle described on the line joining (x_1, y_1) and (x_2, y_2).

6.4 Define tangent and normal.

6.5 Find the condition that a straight line may touch a circle.

6.6 Find the equations of tangent and normal to a circle at any point.

6.7 Solve the problems related to equations of circle, tangent and normal.

7. Understand conic or conic sections.

7.1 Define conic, focus, directrix and eccentricity.

7.2 Find the equations of parabola, ellipse and hyperbola.

7.3 Solve problems related to parabola, ellipse and hyperbola.

DIFFERENTIAL CALCULUS

FUNCTION AND LIMIT

8. Understand the concept of functions and limits.

8.1 Define constant, variable, function, domain, range and continuity of a function.

8.2 Define limit of a function

8.3 Distinguish between f(x) and f(a).

8.4 Establish i) $\lim_{x \to 0} \frac{\sin x}{x} = 1$

ii) $\lim_{x \to 0} \frac{\tan x}{x} = 1.$

9. Understand differential co-efficient and differentiation.

9.1 Define differential co-efficient in the form of

$$\frac{dy}{dx} = \lim_{h \to 0} \frac{f(x+h)-f(x)}{h}$$

9.2 Find the differential co-efficient of algebraic and trigonometrical functions from first principle.

10. Apply the concept of differentiation.

10.1 State the formulae for differentiation:

i) sum or difference
ii) product
iii) quotient
iv) function of function
v) logarithmic function
Find the differential co-efficient using the sum or difference formula, product formula and quotient formula.

10.2 Find the differential co-efficient function of function and logarithmic function.

11. Apply the concept of geometrical meaning of $\frac{dy}{dx}$

11.1 Interpret $\frac{dy}{dx}$ geometrically.

11.2 Explain $\frac{dy}{dx}$ under different conditions

11.3 Solve the problems of the type:
A circular plate of metal expands by heat so that its radius increases at the rate of 0.01 cm per second. At what rate is the area increasing when the radius is 700 cm ?

12 Use Leibnitz's theorem to solve the problems of successive differentiation.

12.1 Find 2nd, 3rd and 4th derivatives of a function and hence find n-th derivatives.
12.2 Express Leibnitz's theorem
12.3 Solve the problems of successive differentiation and Leibnitz's theorem.

13 Understand partial differentiation.

13.1 Define partial derivatives.
13.2 State formula for total differential.
13.3 State formulae for partial differentiation of implicit function and homogenous function.
13.4 State Euler's theorem on homogeneous function.
13.5 Solve the problems of partial derivatives.

INTEGRAL CALCULUS

14 Apply fundamental indefinite integrals in solving problems.

14.1 Explain the concept of integration and constant of integration.
14.2 State fundamental and standard integrals.
14.3 Write down formulae for:
i) Integration of algebraic sum.
ii) Integration of the product of a constant and a function.
14.4 Integrate by method of substitution, integrate by parts and by partial fractions.

14.5 Solve problems of indefinite integration.

15 Apply the concept of definite integrals.

15.1 Explain definite integration.

15.2 Interpret geometrically the meaning of $\int_a^b f(x)dx$

15.3 Solve problems of the following types:

i) $\int_0^{\frac{\pi}{2}} \cos^2 x dx$ ii) $\int_0^1 \frac{(\sin^{-1} x)^2}{\sqrt{1-x^2}} dx$

P* =Practical continuous assessment

5922	PHYSICS–II	T	P	C
		3	3	4

AIMS

- To provide a foundation in scientific principles and processes for the understanding and application of technology.
- To develop an understanding of fundamental scientific concepts through investigation and experimentation.
- To provide a common base for further studies in technology and science.
- To develop the basic knowledge of modern physics.

Short description

Thermometry; Calorimetry, Expansion of materials (effect of heat); Heat transfer; Nature of heat and its mechanical equivalent; Engine.
Principles of light and Photometry; Reflection of light; Refraction of light ; lens.
Concept of Electron and photon; structure of atom, Theory of Relativity.

Detail description

Theory :

1. Thermometry

1.1 Define heat and temperature.
1.2 Mention the units of measurement of heat and temperature.
1.3 Distinguish between heat and temperature.
1.4 Identify the sources of heat.
1.5 Identify the range of the Celsius scale determined by the boiling point and melting point of water
1.6 Compare the Celsius scale, Roamer scale, Fahrenheit scale, Kelvin scale and Rankin scale of temperature measurement.
1.7 State the construction and graduation of a mercury thermometer.
1.8 Describe the operation of different types of thermometers (e.g., maximum and minimum thermometer, clinical thermometer).

2. Heat capacity of materials (calorimetric)

2.1 State the heat as a form of energy.
2.2 Define specific heat capacity.
2.3 State SI units of measurement of specific heat capacity as J/Kgc^0 or J/Kgk^0.
2.4 Define thermal capacity and water equivalent.
2.5 Differentiate between thermal capacity and water equivalent.
2.6 Mention the specific heat capacity of different materials.

2.7 Prove the total heat gained by an object is equal to the sum of the heat lost by all the surrounding objects.

2.8.1 Identify specific latent heat as the energy consumed or liberated when water vaporizes or condenses and when ice melts or freezes.

2.8.2 Explain the effects of a change in pressure on the melting point and boiling point of water.

2.9 Define various kinds of specific latent heat.

2.9.1 Determine the latent heat of fusion of ice and latent heat of vaporization of water.

3. Effects of heat on dimension of materials

3.1 Show that different materials change in size at different amounts with the same heat source.

3.2 Explain the meaning of differential expansion in bimetallic strip, thermostats, compensated pendulum etc.

3.3 Explain the methods of overcoming problems caused by the expansion of materials in buildings, machinery, railway lines and bridges.

3.4 Define the co-efficient of linear, superficial and cubical expansion of solids.

3.5 Mention the units co-efficient of linear, superficial and cubical expansion of solids.

3.6 Mention the linear, Superficial and cubical expansion of a range of common engineering materials.

3.7 Define real and apparent expansion of liquid.

3.8 Define and explain the co-efficient of real and apparent expansion of liquid.

3.9 Distinguish between the co-efficient of real and apparent expansion of liquid.

3.10 Determine the co-efficient of real and apparent expansion of liquid.

4. Heat transfer

4.1 Identify the phenomenon of heat transferring from hot bodies to cold bodies.

4.2 Explain the methods of heat transfer by conduction, convection and radiation with examples of each type of transfer.

4.3 Define thermal conductivity (K) & rate of heat transfer.

State the SI units of thermal conductivity as $\frac{w}{mk}$ or $\frac{w}{mc}$

4.4 List the factors which determine the quantity of heat (Q) flowing through a material.

4.5 Show that the quantity of heat flowing through a material can be found from $Q = \frac{KA\,(\theta_H - \theta_C)t}{d}$

4.6 Outline the properties of materials which give thermal insulation.

4.7 Explain Characteristics of radiant heat energy.

4.8 Describe Emissive power and absorptive power of radiant heat.

4.9 State Stefan-Boltzman Law,
4.10 State Newton's law of cooling.
4.11 State wiens law.
4.12 Explain Green house effect.

5. Nature of heat and its mechanical equivalent

5.1 Describe the caloric theory and kinetic theory of heat.
5.2 State the drawbacks of the caloric theory of heat.
5.3 Explain the mechanical equivalent of heat.
5.4 Explain the first law of thermodynamics .
5.5 Explain Isothermal and adiabatic change.
5.6 Explain Specific heat of a gas, Molar specific heat or molar heat capacity.
5.7 Relate between pressure and volume of a gas in adiabatic Change i, e;$PV\gamma$=const.
5.8 Difference between C_P and C_v for an ideal gas (C_P-C_v=R)

6. 2nd law of thermodynamics

6.1 State and Explain Reversible process and irreversible process.
6.2 State & explain 2nd law of thermodynamics
6.3 Explain heat engine.
6.4 Explain the principle of work of a heat engine.
6.5 Identify thermal efficiency of a heat engine.
6.6 Explain the working principles of internal combustion and external combustion engines (with fair sketches)
6.7 Distinguish between internal combustion engine and external combustion engine. Entropy : Definition, unit and significant.
6.8 Explain Change of entropy in a reversible and irreversible process.
6.9 Give an example of increase of entropy in irreversible process.

7. Preliminaries of light and photometry

7.1 Define light, medium (transparent, translucent, opaque), luminous & non-luminous bodies, parallel, convergent & divergent rays, beam.
7.2 Show the travel of light in straight line.
7.3 Define photometry, luminous intensity, luminous flux, brightness and illuminating power.
7.4 Mention the units of luminous intensity, luminous flux, brightness and illuminating power.
7.5 Mention relation between luminous intensity & illuminating power.
7.6 Explain inverse square law of light.

7.7 Describe the practical uses of light waves in engineering.

8. Reflection of light

8.1 Define mirror (plane & spherical), image (real & virtual) and magnification of images.
8.2 Describe the reflection of light.
8.3 State the laws of reflection of light.
8.4 Express the verification of laws of reflection.
8.5 Define pole, principal axis, center of curvature, radius of curvature, principal focus in case of concave & convex mirrors.
8.6 Find the relation between focal length & radius of curvature of a concave & convex mirror.
8.7 Express the general equation of concave and convex mirror.

9. refraction of light

9.1 Define refraction of light Give examples of refraction of light
9.2 State the laws of refraction and Express the verification of laws of refraction
9.3 Define absolute and relative refractive index and Relate absolute and relative refractive index
9.4 Explain the meaning of total internal reflection and critical angle and Relate total internal reflection and critical angle.
9.5 Give examples of total internal reflection.
9.6 Describe refraction of light through a prism.
9.7 Express the deduction of the relation between refractive index, minimum deviation and angle of the prism.
9.8 Explain Dispersion of light.
9.9 Define lens and mention the kinds of lens.
9.10 Define center of curvature, radius of curvature, principal axis, 1_{st} and 2_{nd} Principal focus, optical center and power of lens.
9.11 Express the deduction of the general equation of lens (eoncave & convex).
9.12 Define Combination of two thin lenses and equivalent lens.
9.13 Identify and List uses of lens.

10. Electron and photon :

10.1 Describe Electrical conductivity of gases.
10.2 Describe Discharge tube.
10.3 Cathode ray : Definition and its properties
10.4 X-ray : Definition, properties & uses
10.5 Discuss Photo electric effect .

10.6 Derive Einstein's photo electric equation

11. Structure of atom :

11.1 Atomic models : Thomson, Rutherford and Bohr model.
11.2 Bohr Hydrogen atom & the theory of hydrogen spectra .
11.3 Define and explain Radio activity.
11.4 Describe Radio active rays.
11.5 Deduce radioactive decay law.
11.6 Define half-life & mean life of radioactive atoms.
11.7 Define nuclear fission & fusion.

12. Theory of relativity :

12.1 Express the theory of relativity.
12.2 Mention different Kinds of theory of relativity.
12.3 Explain special theory of relativity and its fundamental postulate.
12.4 Deduce Einstein's mass -energy relation

Practical:

1. Compare the operation of common thermometers.
2. Determine the co-efficient of linear expansion of a solid by Pullinger's apparatus.
3. Measure the specific heat capacity of various substances.(Brass, steel).
4. Determine the latent heat of fusion of ice.
5. Determine the water equivalent by calorimeter.
6. Compare the luminous intensity of two different light sources.
7. Verify the laws of reflection.
8. Find out the focal length of a concave mirror.
9. Determine the refractive index of a glass Slab.
10. Determine the angle of Minimum deviation and refractive index of a glass prism by using I-D graph.

5811	Social science- I	T	P	C
		2	0	2

OBJECTIVES

To provide opportunity to acquire knowledge and understanding on :
- importance of civics and its relationship with other social sciences
- the relationship of an individual with other individuals in a society
- social organizations, state and government
- rule of law, public opinion and political parties
- UNO and its roles
- the basic concepts and principles of economics and human endeavor in the economic system.
- the realities of Bangladesh economy and the current problems confronting the country.
- the role of Diploma Engineers in industries.
- occupations and career planning for Diploma Enginers.

SHORT DESCRIPTION

Civics and Social Sciences; Individual and Society; Nation and Nationality; Citizenship; state and government; Law; Constitution; Government and its organs; public Opinion; Political Party; UNO and its organs;

Scope and importance of Economics; Basic concepts of Economics- Utility, Wealth, consunmption, income wages and salary and savings; Production – meaning, nature, factors and laws; Demand and Supply; Current economic problems of Bangladesh; Role of Diploma Engineers in the economic development of Bangladesh; Occupations and career planning; Engineering teem.

Part-1 (Civics)

1. Understand the meaning and scope of civics and inter relations of social sciences.
   - 1.1. Define social science.
   - 1.2. State the meaning and scope of civics.
   - 1.3. Explain the importance of civics in the personal and social life of an individual.
   - 1.4. Describe the relationship of all social science (civics, Economics, political science, sociology, ethics)

2. Understand the relationship of the individual with the society, Nationality and nation, Rights and duties of a citizen.
   - 2.1 Define the concept (individual, society, Nation, Nationality, citizen and citizenship).
   - 2.2 State the relationship among the individuals in the society.
   - 2.3 Differentiate between nation and nationality.
   - 2.4 Describe the elements of nationality

2.5 Describe the criteria of Bangladesh nationalism.
2.6 Diferentiate between a citizen and an alien.
2.7 Discuss the methods of acquiring citizenship and state the causes of losing citizenship
2.8 Describe the rights of a citizen and state the need for developing good citizenship.

3. Appreciate the relationship between the state and government, law and organs of government.
   3.1 Meaning the state, government and law
   3.2 Discuss the elements of state.
   3.3 Discuss the classification of the forms of government
   3.4 Distinguish between cabinet form of Government and presidential form of government.
   3.5 Describe the main organs of Government (legislature, Executive and judiciary)
   3.6 Discuss the sources of law

4. Understand and the classification of constitution
   4.1 Explain the deferent form of Constitution
   4.2 Explain the merits and demerits of different forms of constitution and state the salient feature of Bangladesh constitution

5. Understand the importance of the formation of public opinion and the role of political parties in the affairs of state and government.
   5.1 Define the public Opinion and political party.
   5.2 Explain the importance of public opinion in the modern democratic society.
   5.3 Discuss the role of different media in forming public opinion.
   5.4 Discuss the importance of political parties in democracy.

6. Understand the role of UNO in maintaining world peace
   6.1 Explain the major functions of UNO.
   6.2 State the composition and functions of General Assembly.
   6.3 Describe the Composition and functions of security council.
   6.4 Discuss the role of Bangladesh in the UNO.

Part-2 (Economics)

1. Understand the importance of the study fundamental concepts of economics.
    - 1.1 Discuss the definition of Economics as given by eminent economists.
    - 1.2 Describe the scope and importance of economics of Technical Student.
    - 1.3 Define commodity, utility, value, wealth, consumption, income, savings wages and salary.
    - 1.4 Differentiate between value in use and value in exchange.
    - 1.5 Explain wealth with its characteristics.

2. Understand the production process and the concept of the law of diminishing returns in the production process.
    - 2.1 Discuss production mode and process
    - 2.2 Explain the nature of different factors of production.
    - 2.3 Discuss the law of diminishing returns.
    - 2.4 State the application and limitations of the law of diminishing returns.
    - 2.5 Describe the law of production (increasing constant and diminishing).

3. Appreciate the importance of the concept of elasticity of demand.
    - 3.1 Illustrate the law of diminishing utility.
    - 3.2 Define the marginal utility explain the law of dimishing marginal utility.
    - 3.3 define the term, “demand”
    - 3.4 Describe elasticity of demand and factors which determine the elasticity of demand
    - 3.5 Describe elasticity of supply with the help a supply curve.

4. Understand national income and population control.
    - 4.1 Explain national income.
    - 4.2 Discuss GDP and GNP.
    - 4.3 Discuss growth rates.
    - 4.4 Explain features of Bangladesh population.
    - 4.5 State measures to be undertaken to arrest high growth rate of population.

5. Understand the current issues and the avilability and use of natural resource in the economic development of Bangladesh
    - 5.1 Identify major problems of rural and urban economy.
    - 5.2 Explain income distribution in alleviating poverty in equality and discrimination.
    - 5.3 Explain the migration of rural population to urban areas.
    - 5.4 List of the Natural resource of Bangladesh and classify them according to sources of availability.
    - 5.5 Explain the importance of the mine, forest and water resources and protential uses for sustainable development.

6. Understand the role of a Diploma Engineer in the Development of Bangladesh Economy.
   - 6.1 Explain the concept of the term, “Engineering team”
   - 6.2 Identify the functions of Engineers, Diploma Engineers, craftsmen forming the engineering team.
   - 6.3 Discuss the role of a Diploma Engineer in the overall economic development of Bangladesh.

7. Appreciate the career prospects for Diploma Engineers in different production/service engineering organizations.
   - 7.1 Explain the employment opportunities for diploma engineers in different sectors and sub Sectors of economy
   - 7.2 Explain socio-economic status of a diploma Engineer.
   - 7.3 Explain prospects of diploma Engineers in self-employment.

5711	BANGLA	T	P	C
		2	2	3

উদ্দেশ্য ঃ

1| fvlv `¶Zv mg‡ni (Language skills) cv‡hvMK †hvM¨Zv ARb |

2| evsjv mwnZ¨ cVb- cvV‡bi gva¨‡g evOvjx RvZxqZv‡eva, †`k †cg, ˆbwZKZv, g³wPšÍv I gj¨ †ev‡ai D‡b¥l NUv‡bv|

msw¶ß weeiYx t

evsjv fvlv t gvZfvlv I mRbkxjZv ; Mí, KweZv, ceÜ, bvUK I Dcb¨vm msKjb Ges evsjv fvlv ixwZi we‡fbZv evbvb NwUZ mgm¨v I D"PviY ixwZ weiPb I cÎ iPbv|

বিশদ বিবরণী ঃ

১ বাংলা ভাষার নির্ভুল প্রয়োগ ঃ

K) **বাংলা ভাষা ঃ** fvlvi msÁv, evsjv fvlvi Drcw‡Ë I µg weKvk, evsjv fvlv ixwZ- mva, Pwjz ixwZ I Av‡Âwj K ev Dcfvlv (msÁv, ˆewkó, cv_K¨ I D`vniY)

L) **বাংলা বানান ও উচ্চারণ বিধি ঃ** ¯ieY, e¨ÄbeY I h³ e‡Yi MVb †KŠkj, bvg,D"PviY I D`vniY; evsjv GKv‡Wgxi cwgZ evbvb ixwZ RvZxq wk¶vµg I cvV¨ c¯ÍK †ev‡Wi evbvb ixwZ; D"PviY ixwZ I D"PviY mÎ-evsjv D"Pvi‡bi ixwZ mgn, eûj cPwjZ wKQ k‡ãi evbvb I D"PviY evbv‡bi Aï×, ev‡K¨ c‡`i c`-c‡qvM I c` web¨v‡m fj, mva I Pwjz ixwZi wgkYRwbZ fj|

M) **বিরচন ঃ** fvem¤cmviY, mvivsk I mvigg; cwZ‡e`b iPbv|

N) **পত্র রচনা ঃ** e¨w³MZ, mvgwRK, `vßwiK, msev`cÎ cKvk Dc‡hvMx, ¯§viK wjwc, gvb cÎ; Av‡e`b cÎ--cwZôvwbK, PvKwii Av‡e`b, RxebeËvšÍ BZ¨vw`|

২ বাংলা সাহিত্য ঃ

ক) কবিতা

- e½ fvlv-- gvB‡Kj gamab `Ë
- ‡mvbvi Zix -- iex›`bv_ VvKi
- gvbl-- KvRx bRi"j Bmjvg
- evsjvi gL Awg †`wLqvwQ-- Rxebvb›` `vk

খ) ছোট গল্প ঃ

- ‡LvKveviei cZ¨veZb --iex»` VvKi
- g‡nk -- kir P›` P‡Uvcva¨vq
- GK‡ki Mí -- Rwni ivqnvb

গ) প্রবন্ধ ঃ

- Aav½x -- †eMg †iv‡Kqv mvLv IqvZ †nv‡mb
- Rxeb I e¶ -- †gvZv‡ni †nv‡mb †PŠaix
- ms¯wZ - Avej dRj

ঘ) **একাঙ্কিকা**
gvbl -- gbxi †PŠaix

0) **মুক্তিযুদ্ধের উপন্যাস ঃ** (†h †Kvb GKwU)
- Av¸‡bi cikgwb- ûgvqb Avn‡g`
- Rbbx mvnwmbx - 1971 --Awbmj nK

১. **নির্ধারিত বক্তৃতা ঃ** wewfb RvZxq w`em welqK -- weRq w`em, GK‡k †de"qwi, AvšÍRwZK gvZfvlv w`em, ¯vaxbZv w`em, 15 AvM÷-RvZxq †kvK w`em, †g w`em|
cwZôvbK e³Zv Ñ bevMZ wk¶‡Ki eiY, we`vqx Qv Î‡`i D‡Ï‡k¨ e³Zv, wk¶v gšx/ gnvcwiPvjK/ †Pqvig¨vb Gi AvMgb Dcj‡¶ e³Zv|

2. **আবৃত্তি ঃ**
- evkx -- iex›`bv_ VvKi
- KvÛvix ûwkqvi -- KvRx bRi"j Bmjvg
- nvq wPj--Rxebvb›` `vk
- cwZ`vb -- Rmxg Dwïb
- wmwo - mKvšÍ fÆvPvh
- †Zvgv‡K cvlqvi Rb¨ †n ¯vaxbZv --kvgmi ingvb
- eYgvjv Avgvi `twLbx eYgvjv -kvgmi ingvb
- wPwV w`l - gnv‡`e mvnv|

3. **বিতর্ক ঃ**
- weÁvb Avkxev` bv Awfkvc|
- Qv Î ivRbxwZ wbqšbB cKZ MYZš cwZôvi c_|
- Bs‡iwR gva¨g wk¶v c×wZ RvZxqZv‡eva I †`k‡cg mwói cavb AšÍivq|
- chw³i weKvkB cKwZ webv‡ki GKgv Î KviY|
- ms¯‹ZB AvawbK gvb‡li ag|
- gw³h‡×i †PZbvB Amv¤c`wqK evsjv‡`k cwZôvi gjgš|
- AvKvk ms¯‹Z he mgv‡Ri ^bwZK Ae¶‡qi gj KviY|
- Pvj‡Ki AmZKZvB moK `NUbvi cavbZg KviY|

4. **উপস্থিতি বক্তৃতা ঃ**
welqe¯ Db¤³|

5. **প্রতিবেদন উপস্থাপন ঃ**
- D×Zb KZc‡¶i Kv‡Q Dc¯vcb
- msev`c‡Î cKv‡ki Rb¨ †civY