

Military Technological College				Coursework	
Department: Aeronautical, Marine, Systems				Coursework Portfolio	
MTCM 3011		Date Set: Click here to enter a date.	Lecturer:	Dr Muhammad Raisuddin Ahmed	
Artefact: 1 of 2	Contribution: 30%	Date Due: Click here to enter a date.	Student number:		

Hand in:

Submit your report via the Turnitin link on Moodle before TBA

Objectives:

In this artefact, students will do a technical assignment covering learning outcome 1, 2 , 6 , and 7 as a task 1 and task 2 will carry out a series of laboratory experiments to cover Learning outcome 7.

Task:

Task 1: Technical Assignment

Task 2: Laboratory Experiments

Background:

The students have developed basic understanding of Electrical Engineering Principles for DC circuits and calculations. Students have carried out various laboratory tasks on FESTO Equipment. This Laboratory report is required to be comprehensively comprised of all laboratory tasks coupled with theoretical knowledge covered throughout the course of studies.

Equipment:

FESTO Motor and Generator manual

Procedure:

In the FESTO Laboratory manual

Learning outcomes:

Learning Outcomes (1, 2, 6 & 7)

- 1 Describe the basic structure of the atom and explain the significance of the nucleus, protons, neutrons and electrons in the context of electricity and the movement of electrical charges within conductor and insulator materials and explain how electrical energy is generated by light, heat, friction, pressure and movement.
- 2 Describe the construction and provide simple explanations of the chemical reaction of various primary and secondary cells and batteries in general use and conduct associated measurements and calculations.
- 6 Explain the characteristics of natural magnets, magnetic and non-magnetic materials and magnetic fields, the phenomenon of electromagnetism, and factors determining electric field strength and direction.

- 7 Sketch the construction and explain its theory of operation of DC generators and motors.

Reading / References:

The Module teaching notes issued to students by the course team at the start of the Module.

Instructions:

- 1 *Submit your report via the Turnitin link on Moodle before the due date mentioned above.
- 2 **The date you upload to Moodle is considered as the 'Date of Submission' when calculating the late submission.
- 3 Any late submission will result in late submission cap being applied.
- 4 For further information, related to MTC assessments and examinations, please refer to the regulations sections in MTC examinations website.
- 5 This is an individual report and should not exceed 2000 words

Method of feedback to the students

Feedback will be provided to the student through Turnitin only.

Deferred First attempt and second attempt

Deferred First Attempt that requires coursework; students will be allowed an extended submission period, as described in the Examination and Assessment Regulations.

Second Attempt Assessment will be by a 2 hour examination to cover all learning outcomes.

PLAGIARISM

Work in this assignment is covered by the plagiarism regulations of MTC where any work submitted for assessment, should be the product of the individual student effort ONLY and not the work of others - e.g. other students, or external sources such as the internet. Please be aware that any form of plagiarism will be dealt with appropriately according to:

https://moodle.mtc.edu.om/pluginfile.php/40026/mod_resource/content/1/Academic%20Integrity%20and%20Misconduct%20Policy%20-%202007%20Nov%202017.pdf

The Military Technological College regulations require students to keep electronic copies of all assignments, and submit these at any time upon request.

Task 1: Technical assignment

Students are required to answer the following questions in their own words based on their understanding from the lectures and readings:

1. Explain by means of energy level, why we cannot use Copper, Silicon and Germanium as Insulator?

[6 Marks]

[1 mark each x 3 explanations and 1 mark x 3 correct diagrams with annotations]

2. Compare at least 6 characteristics for Lead Acid and Nickel Cadmium batteries in terms of advantage for one and disadvantage for the other and vice versa.

[3 Marks]

[0.5 mark for each characteristic compared]

3. Considering the advantages and disadvantages of each battery, please, discuss which type of battery will be preferred in following application. Your answer should include a justification of your choices:
 - a. Engine starting
 - b. For floats, which require long periods before, the battery is replaced.
 - c. Low temperature application
 - d. High temperature applications
 - e. Telephone systems
 - f. Low maintenance requirement

[3 Marks]

[0.5 mark for correct selection and reasoning]

4. Magnetism plays a very important part in the world of Electrical engineering. Given the following materials below:
 - a. Alnico
 - b. Supermalloy
 - c. Gold

Discuss showing evidence which of these materials are best used as magnets and which are not. You are also required to discuss how magnetism can be created artificially and the means to control field strength and field direction.

[4 Marks]

[1 mark for each material and 1 for how magnetism can be created]

5. A DC series motor can be driven by either DC or a rectified AC. Therefore its speed is not dependent on the supply frequency. There will be a requirement to control the rotational speed of the motor. This can be controlled by either Armature control or Field control. Using a diagram or diagrams, where required, discuss the differences between the two methods explaining how each method will control the rotational speed of a motor. No reference to power losses required.

[4 Marks]

[2 for each method discussed]

NOTE: The following rubric will be used in assessing your answers to the above questions.

Excellent	Very Good	Good	Pass at Threshold	Fail
The answer is comprehensive with complete analysis	The answer is comprehensive with some analysis	The answer is complete with comprehensive explanations	The answer is mostly complete with basic explanations	No or irrelevant answer

Task 2: Laboratory Experiments

Based on the experiments had carried out, students are required to write a separate report on the following Experiments:

Experiment 1: The Direct Current Motor

[20 Marks]

Experiment 2: The DC Separately Excited Shunt Generator

[20 Marks]

Experiment manuals with review questions will be available in Moodle. Please refer to (Experiment 1, 2) files for the detailed procedure of the experiments.

Students are instructed to follow the following report structure for each experiment.

i. Introduction

[2 Marks]

ii. Experiment result

[10 marks]

iii. Discussion

[6 Marks]

iv. Conclusion

[2 Mark]

Marking Rubric - Follow this for all 2 individual LAB reports

Total Marks: /20						
	Excellent (2)	Very Good (1.5)	Good (1)	Pass at Threshold (0.8)	Fail (0)	Marks
Introduction	The introduction is very detailed and comprehensive, states the general information about the topic and the main objective.	The introduction is engaging and states general information about the topic and the main objective.	The introduction states the main objective of the topic and previews the structure of the report.	The introduction partially states the main objective of the topic and partially previews the structure of the report.	There is no clear introduction or main topic and the structure of the report is missing.	/ 2
	Excellent (10)	Very Good (8)	Good (6)	Pass at Threshold (4)	Fail (0)	Marks
Experiment result	Provides measurements obtained and diagrams/symbols or figures where required. Result is same with reference data.	Provides measurements obtained and diagrams/symbols or figures where required. Result is close to reference data	Provides some measurements obtained and diagrams/symbols or figures but missing at places.	Provides some measurements obtained and diagrams/ figures. Weak result	Provides no measurements obtained and diagrams/symbols or figures where required	/ 10
	Excellent (6)	Very Good (5)	Good (3)	Pass at Threshold (2.4)	Fail (0)	Marks
Discussion	The Discussion is comprehensive with complete analysis of the experiment result	The Discussion is comprehensive with some analysis of the experiment result	The Discussion is comprehensive	The Discussion is incomplete with basic knowledge of the experiment result.	No or irrelevant discussion	/ 6
	Excellent (2)	Very Good (1.5)	Good (1)	Pass at Threshold (0.8)	Fail (0)	Marks
Conclusion	The conclusion is comprehensive and indicates thorough understanding of the exercise.	The conclusion is good and indicates clear understanding of the exercise.	The conclusion is complete and indicates basic understanding of the exercise.	The conclusion is complete but lacks basic understanding of the exercise.	Incomplete and/or unfocused.	/ 2

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Submit your report via the Turnitin link on Moodle before < > on < >.

Before you submit your work, check your work and consider the following points:

Covering information	
My title/cover page clearly shows:	
☐	My student number
☐	Assignment title
☐	Unit title
Results and Discussion	
☐	I present the test results clearly and with the support
☐	I discuss the relationship
☐	I consider the
☐	I have provided a conclusion
Other sections of the report	
☐	I state the aim of the work
☐	I briefly describe the test procedures involved in analysing
☐	I show a worked example of the calculations
☐	I clear identify
☐	I link the conclusion back to the aim of the work
Overall presentation	
☐	The structure of my report conforms to report
☐	Where I use a reference I list it using the Harvard format
☐	My report is clear and concise
☐	I specify S.I. units for all values quoted
☐	My tables and graphs are correctly numbered and labelled
☐	I write in impersonal, past tense
☐	I make correct use of grammar, spelling and punctuation

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Grade Criteria

Please refer to the grade descriptors given in the Student Handbook. The following table shows specific features of work at each grade for this particular coursework and level of study.

Grade (%)	Specific Features
80+	Results presented appropriately and discussion shows evidence of thorough understanding of the subject matter, showing some originality or creativity. Other sections of the report are clear and logical, making very good use of references beyond the material given. Report is well-presented, written in impersonal, past tense with no errors.
70-79	Results presented appropriately and discussion shows evidence of thorough understanding of the subject matter. Other sections of the report are clear and logical, making good use of references beyond the material given. Report is well-presented, written in impersonal, past tense with few or no errors.
60-69	Results presented appropriately and discussion shows evidence of understanding of the subject matter. Other sections of the report are clear. Appropriate references used. Report is well-presented and correctly structured, with few errors in use of units, citation of references and format of graphs and tables.
50-59	Results suitably presented and described. Discussion shows evidence of consideration of the significance of the results. Adequate description of procedures and aims. Some references given beyond provided material. Report is generally consistent in presentation and follows instructions given with some errors.
40-49	Results suitably presented and described. Adequate description of procedures and aims. Some references given but relies on material provided. Referencing and presentation attempt to follow instructions given.
30-39	Incomplete results, little or no discussion. Inadequate description of experiment and aims. No or very few references given. Poor, inconsistent presentation. Incorrect structure.
0-29	No serious attempt to address the problem. Evidence of group working or plagiarism.