



# Tertiary & Vocational Education Commission



## Automobile Technology – Part II

### NCT Equivalence Examination

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#### Instructions:

1. This paper consist 05 questions.
2. Question No. 01, 02, 03 and 04 contain part A and Part B. Answer only one part of each question
3. Question No. 05contains 03 parts, Part A, Part B and Part C. Answer only one part of each question.

#### 01. Part A

- a. How can you assess competencies of a technician? State five factors. (Marks: 1x5)
- b. When do you need to asses competencies? State five factors. (Marks: 1x5)
- c. State 05 factors to be considered in purchasing plant & equipment. (Marks: 1x5)
- d. State 05 factors you expect when receiving materials. (Marks: 1x5)

#### Part B

- a. What are the costs involved in purchasing plant & equipment? State five. (Marks: 1x5)
- b. What are the environmental factors to be considered? State five factors? (Marks: 1x5)
- c. How can you adjust your work priorities? State five factors. (Marks: 1x5)
- d. Explain briefly, the key areas to be conceded when planning a job? (Marks: 1.25 x 4)

#### 02. Part A

- a. Write five places which Vehicle emission is created. (Marks: 1x5)
- b. Briefly explain regulation of vehicle emission control in Sri Lanka. (Marks: 5)
- c. Explain operation and advantage of PCV valve for emission control. (Marks: 1x5)
- d. Write five advantages of electronic ignition system, compare with conventional ignition system. (Marks: 1x5)
- e. Write five sensors which located in engine and briefly explain their functions. (Marks: 1x5)

#### Part B

- a. Explain operation and advantage of three ways Catalytic Converter for emission control. (Marks: 5)
- b. Explain operation and advantage of PCV valve for emission control. (Marks: 5)
- c. What are the advantages using higher compression ratio in engine. (Marks: 1x5)
- d. What are the barriers to increase compression ratio in petrol engine. (Marks: 1x5)

### 03. Part A

- a. Most of the automobile uses lead acid batteries. What are the advantages that it has? (Marks: 4)
- b. Explain briefly the function of the Permanent Magnet & Electro-magnet starting motors. (Marks: 2.5x2)
- c. State the advantages and disadvantages of pneumatics system. (Marks: 1x5)
- d. Explain the main elements of the air service unit. (Marks: 2x3)

### Part B

- a. Explain the purpose and function of the Regulator of the charging system in Automobiles. (Marks: 2.5x2)
- b. If the starting system gives trouble what are the major points to be tested to rectify the fault? (Marks: 1x5)
- c. Distinguish between hydraulics and pneumatics control systems. (Marks: 1x5)
- d. List the different pneumatic position sensors. (Marks: 1x5)

### 04. Part A

- a. Briefly explain the energy conversion done by a vibration damper? (Marks: 2)
- b. Explain three operating positions of a modulator belongs to Anti-skid Braking System (ABS) (Marks: 3x3)
- c. What is purpose of having a differential on a vehicle? Explain briefly. (Marks: 2x3)
- d. Explain the term "Steering Geometry". (Marks: 3)

### Part B

- a. Explain advantages and disadvantages compared to the conventional rigid axle suspension and independence suspension. (Marks: 5)
- b. What advantages having offset axes (Hypoid drive) on final Drive? (Marks: 5)
- c. Explain the function of Stator in a Torque Converter. (Marks: 5)
- d. Elaborate the difference between fluid coupling and Torque Converter. (Marks: 5)

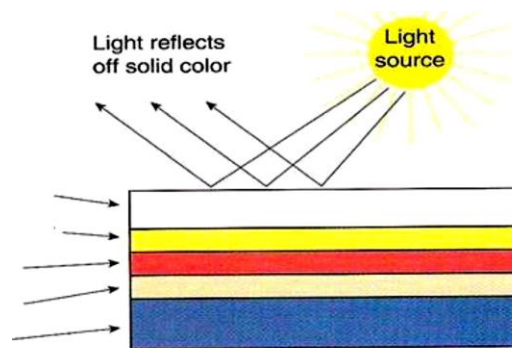
### 05. Part A

- a. Draw a block diagram of an Automobile Air conditioning System. (Marks: 6)
- b. Briefly describe three (03) main components in the system. (Marks: 2x3)
- c. Name three (03) type of compressor used for automobile air conditioning. (Marks: 1x3)
- d. Give five (05) good characteristics of refrigerant. (Marks: 1x5)

### Part B

- a. State 3 main welding methods used in automotive collision repair industry. (Marks: 1x3)
- b. Indicate six main defect of a vehicle, If the accident repair is not in proper standard. You can't assure about the structural strength of your vehicle (may be over strength or weak) (Marks : 1x6)

- c. Give six main influences from environment and weather which provides protection by automotive paint to a vehicle body. (Marks: 1x6)
- d. Name the layers of a solid paint given in below diagram. (Marks: 1x5)



### Part C

- a. Draw the graph of Pressure versus volume for Otto Engine. (Marks: 4)
- b. Explain Otto Cycle. Using above PV Diagram (Marks: 4)
- c. Four stroke four cylinder engine has a bore 80mm, stroke 60mm and compression ratio 10:1. This engine is rebored to 1.5mm oversize. Calculate;
- Original engine capacity (Marks: 3)
  - New Engine Capacity (Marks: 3)
  - Compression ratio after reboring. (Marks: 6)
- (Assume that combustion chamber volume is constant)