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**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER I  
SESSION 2019/2020**

COURSE NAME : ADVANCED AUTOMOTIVE TECHNOLOGY

COURSE CODE : BNG 30303

PROGRAMME CODE : BNG

EXAMINATION DATE : DECEMBER 2019 / JANUARY 2020

DURATION : 2 HOURS 30 MINUTES

INSTRUCTION : ANSWER **FOUR (4)** QUESTIONS ONLY

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THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

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- Q1** (a) List **FIVE (5)** requirements for tyres on passenger cars and light commercial vehicles, and briefly describe each requirement. (10 marks)
- (b) Given that 175/65 R 14 82 H tyre mounted on the measuring rim of 5J x 14, with the outside diameter of the tyre is 584 mm and width of cross-section is 177 mm.
- (i) State the design code for this tyre.
  - (ii) Determine the percentage (%) cross-section ratio profile for this tyre.
  - (iii) Identify the rim diameter.
  - (iv) Calculate the height of the given tyre.
  - (v) Calculate the height-to-width ratio of the given tyre. (9 marks)
- (c) There are **TWO (2)** types of rolling resistance. Name these **TWO (2)** types and describe each resistance. (6 marks)
- Q2** (a) There are **THREE (3)** types of suspension in automobile sector, which are dependent, semi-dependent, and independent type. McPherson strut is of the independent type of suspension;
- (i) Analyse the independent type of suspension working principle. (4 marks)
  - (ii) Discover **THREE (3)** advantages and disadvantages of McPherson strut type suspension. (6 marks)
- (b) (i) Describe the construction of semi-elliptical leaf spring and demonstrate its working principle. (5 marks)
- (ii) Sketch the appropriate figure to support your answer. (5 marks)
- (c) Explain **FIVE (5)** advantages of air suspension system. (5 marks)

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- Q3** (a) There are **TWO (2)** types of steering systems that are used on modern cars and light-duty trucks. State these **TWO (2)** types and describe its function. (10 marks)
- (b) (i) Differentiate between conventional and rack-and-pinion steering gears. (2 marks)
- (ii) Based on your answer in **Q3 b(i)**, analyse its working principle. (3 marks)
- (c) (i) Point out the main feature of power steering. (4 marks)
- (ii) Describe its operating principle. (6 marks)
- Q4** (a) Braking systems are based on the Pascal's Law. State the Pascal's Law and briefly explains its working principle in braking system. (5 marks)
- (b) Describe the function of master cylinder and analyse its working principle during braking process. (10 marks)
- (c) List **TWO (2)** most common types of power assist systems to aid the driver when applying the brakes. (10 marks)
- Q5** (a) There are **FIVE (5)** basic load cases imposed on the chassis of a passenger car due to normal running condition. Explain each load cases. (15 marks)
- (b) Discover **FOUR (4)** functions of the chassis frame. (4 marks)
- (c) Describe **THREE (3)** types of chassis frame. (6 marks)

–END OF QUESTIONS–