

GENERAL CERTIFICATE OF EDUCATION BOARD  
Technical and Vocational Education Examination

MECHANICAL TECHNOLOGY 1  
5140

JUNE 2021

INTERMEDIATE LEVEL

Specialty (specialty code)	AUTOMOBILE REPAIR MECHANICS (ARM)
Centre No. & Name	
Candidate Identification No.	
Candidate Name	

Mobile phones are **NOT** allowed in the examination room.

5140 MECHANICAL TECHNOLOGY 1: MULTIPLE CHOICE QUESTION PAPER

1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

*Read the following instructions carefully before you start answering the questions in this paper. Make sure you have a soft HB pencil and an eraser for this examination.*

1. USE A SOFT HB PENCIL THROUGHOUT THE EXAMINATION.
2. DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

*Before the examination begins:*

3. Check that this question booklet is headed “**Intermediate Level – 5140 MECHANICAL TECHNOLOGY 1.**”
4. Fill in the information required in the spaces above.
5. Fill in the information required in the spaces provided on the answer sheet using your HB pencil:

**Candidate Name, Exam Session, Subject Code and Candidate Identification Number.**

Take care that you do not erase or fold the answer sheet or make any marks on it other than those asked for in these instructions.

*How to answer the questions in this examination:*

6. Answer **ALL** the **50** questions in this Examination. All questions carry equal marks.
7. Each question has **FOUR** suggested answers: **A, B, C** and **D**. Decide which answer is correct. Find the number of the question on the Answer Sheet and draw a horizontal line across the letter to join the square brackets for the answer you have chosen.

For example, if **C** is your correct answer, mark **C** as shown below:

[A] [B] [~~C~~] [D]

8. Mark only one answer for each question. If you mark more than one answer, you will score a zero for that question. If you change your mind about an answer, erase the first mark carefully, then mark your new answer.
9. Avoid spending too much time on any one question. If you find a question difficult, move on to the next question. You can come back to this question later.
10. Do all rough work in this booklet, using, where necessary, the blank spaces in the question booklet.
11. **At the end of the examination, the invigilator shall collect the answer sheet first and then the question booklet. DO NOT ATTEMPT TO LEAVE THE EXAMINATION HALL WITH IT.**

Turn Over

1. Before working under a car lifted with a hydraulic jack, you should
- A block the return way of the jack
  - B let someone be watching the jack as you work
  - C block all the wheels with a stone
  - D place safety rams or blocks around the suspension

2. The volume occupied by 5milli Liters of oil is
- A 0.05cm<sup>3</sup>
  - B 0.5cm<sup>3</sup>
  - C 5cm<sup>3</sup>
  - D 50cm<sup>3</sup>

3. One function of the clutch is to
- A permit gear changing when the vehicle is in motion
  - B multiply engine power into the gearbox
  - C permit the vehicle to be on reverse
  - D cause the vehicle to be on permanent neutral

4. The engine shown in figure 1 below has

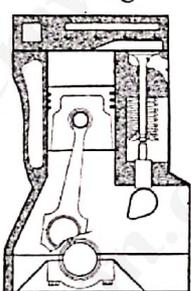


Figure 1

- A overhead camshaft and side valves
- B side camshaft and side valves
- C side camshaft and overhead valves
- D overhead camshaft and overhead valves

5. The silencer shown in figure 2 below is called a

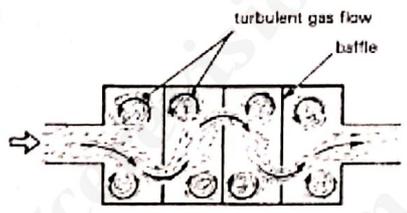


Figure 2

- A composite type
- B capacity type
- C absorption type
- D high frequency type

6. What type of piston crown shape is shown in figure 3 below?



Figure 3

- A Domed
- B Concave
- C Complex
- D simple

7. Identify the type of oil pump in figure 4 below

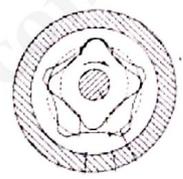


Figure 4

- A Gear
- B Eccentric vane
- C Internal/ external
- D Eccentric rotor

8. Unbalanced braking can be caused by

- A contaminated friction surface
- B air in the hydraulic system
- C over inflated tyre
- D excessive castor

9. The ventury in the carburetor helps to

- A increase air pressure
- B decrease air pressure
- C decrease fuel pressure
- D maintain air pressure

10. Identify and give the function of the part labelled (A) in the gear assembly in figure 5 below

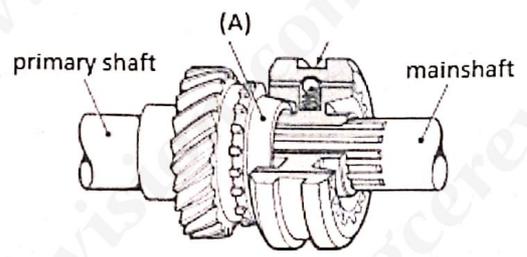


Figure 5

- A Dog clutch, to engage the drive
- B Synchronizer, equalises the speed of two gears before engagement
- C Interlocking gear, lock gears in engagement
- D Friction cone, mesh gears smoothly during engagement

11. The main function of the tyre is to  
 A suspend the vehicle  
 B eliminate road shocks on to suspension system  
 C permit the generation of traction, braking and steering forces on any road surface  
 D house the braking components
- 
12. The drop arm is connected through a ball joint to the  
 A track rod  
 B track arm  
 C steering arm  
 D drag link
- 
13. The engine oil level is checked with the aid of  
 A an oil gauge  
 B a check rod  
 C a deep stick  
 D a level gauge
- 
14. Which one of the following is a unit of volume?  
 A mm  
 B  $\text{cm}^3$   
 C  $\text{m}^2$   
 D  $\text{mm}^3$
- 
15. A lubricant reduces friction by  
 A absorbing the friction energy  
 B applying pressure in the direction of motion  
 C polishing the toe surfaces  
 D holding the surfaces apart
- 
16. The velocity of a car is the  
 A speed  
 B change in acceleration  
 C rate at which it changes its speed  
 D rate at which it moves in a given direction
- 
17. The hand brake system is used to  
 A prevents the vehicle from rolling or moving once the vehicle is at rest  
 B retard or stop a moving vehicle during braking  
 C prevent the vehicle from hitting an oncoming one when driving  
 D retard the vehicle movement when changing the gear up a steep hill
- 
18. Brake fade is caused by  
 A lack of brake fluid in the reservoir  
 B leakage along the pipe line  
 C overheat due to prolonged braking  
 D worn out brake shoes
- 
19. The amount of air fuel mixture taken in by the engine on the suction stroke is a measure of the engine's  
 A compression ratio  
 B volumetric efficiency  
 C clearance volume  
 D intake volume
- 
20. The stroke of an engine is the  
 A volume of the cylinder  
 B length of the connecting rod  
 C internal diameter of the cylinder  
 D distance between TDC and BDC
- 
21. The component that connects the steering rack to the knuckle is  
 A tie rod  
 B sector  
 C pivot  
 D spline
- 
22. The main feature of MacPherson strut suspension is that  
 A the vertical size of the suspension can be made more compact  
 B non vertical external forces are supported by the suspension arms  
 C the unsprung mass is lighter  
 D the assembly is slightly more complicated in design
- 
23. In a square type engine,  
 A the geometrical shape is square  
 B the diameter and length of piston are same  
 C two cylinders are placed horizontal and two vertical  
 D stroke length and cylinder bore are same
- 
24. The power actually developed inside the engine cylinder is called  
 A indicated power  
 B brake power  
 C frictional power  
 D lost power
- 
25. The function of oil control ring is that it  
 A lubricate the cylinder walls by releasing oil from its holds  
 B keeps the cylinder walls lubricated by holding oil in its channel  
 C prevents engine oil from going into the combustion chamber and returns excess lubricating oil off the cylinder wall through the return holes in the piston to the oil pan  
 D maintains a seal and prevents escape of burn gases and oil leakage

26. The parking brakes employed in vehicles are operated
- Mechanically
  - Hydraulically
  - pneumatically
  - Electrically

27. The connecting rod is attached to the piston by the
- cap bolt
  - piston pin
  - cap roller bearing
  - rod cap

28. In a diesel engine, the function of a fuel injector is to
- mix the fuel and air
  - ignite the air fuel mixture
  - provide flame front for ignition
  - spray atomised fuel in the cylinder

29. One function of the final drive is to
- Assist the vehicle when cornering
  - Make sure that the inner wheels rotates less than the outer wheels when cornering
  - Turn the drive through an angle of  $90^{\circ}$
  - Prevent vibration

30. Rotary motion of the steering wheel is converted to a reciprocating motion of the track by the
- track arm
  - stub axle
  - steering box
  - track rod

31. All of the following can lead to deformed cylinder head except
- overheating of the engine
  - uneven tightening
  - wrong timing
  - weak valve spring

32. Which of the following is associated with combustion knock?
- Missing
  - Popping back
  - Explosion at the exhaust
  - Pinking

33. The power train transmits power from the engine to the
- Crankshaft
  - rear wheels
  - front wheels
  - steering gears

34. In single dry plate clutch, torsional vibrations are absorbed by
- coil spring or torsional spring
  - cushion spring

- central hub
- clutch pedal

35. The sun gear in the planetary gear system meshes with the
- pinion cage
  - ring gear
  - clutch gear
  - planet pinion

Figure 6 below shows a unit in the transmission system. Answer questions 36 and 37 using figure 6.

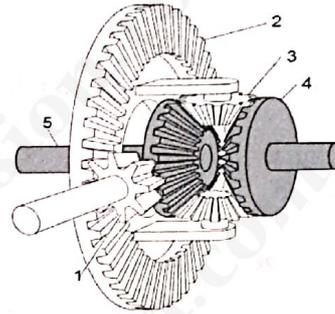


Figure 6

36. Part 1 and 2 in figure 6 are called

- sun gears
- planet and sun gears
- ring gears
- pinion and crown wheel

37. Part 3 and 4 are called

- ring gears
- pinion and crown wheel
- planet and sun gears
- sun gears

38. A meshing gear with 4:1 ratio and a smaller gear has 12 teeth, the large gear will have

- 12 teeth
- 24 teeth
- 36 teeth
- 48teeth

39. Clutch slip is caused by

- less driver effort
- disconnected cables
- worn disc
- no clutch fluid

40. Free pedal travel is a movement made before the release bearing comes up against the

- release lever
- flywheel
- floor board
- Stop

41. The Ackermann steering layout ensures  
A easy turning of wheels  
B steering reversibility  
C reduction of load  
D good ground contact
- 
42. One of these is not a component of the power assisted steering  
A Ram  
B Reservoir  
C Steering arm  
D Pump
- 
43. The laminated spring commonly use is of the form  
A full elliptical  
B semi elliptical  
C one quarter elliptical  
D three quarter elliptical
- 
44. To ensure flexibility of suspension joints, one of the following should be used  
A Metal bearings  
B Seals  
C Rubber bushing  
D Clips
- 
45. The disc brakes has an advantage over drum in that it  
A dissipate heat faster  
B is used in all design vehicles  
C is faster  
D does not wear
- 
46. The hand brakes are easy to attach to  
A drum brakes  
B disc brakes  
C Callipers  
D wheel cylinders
- 
47. The function of the thermostat in the cooling system is to  
A increase the flow of water through the radiator  
B restrict the flow of water in the radiator to the engine when the engine temperature is high  
C restrict the flow of water in the radiator to the engine when the engine temperature is too low  
D lower the temperature of the engine when there is no water in the radiator
- 
48. Oil seals are fitted on hubs to  
A prevent brake fluid from entering the bearing  
B allow excess lubricant to be forced under lip  
C ensure silent running  
D contain lubricant and prevent the entry of water and dirt
- 
49. In the disc brake, the disc is attached to the  
A wheel  
B axle  
C suspension  
D road wheels
- 
50. The function of the crown wheel and the pinion is to  
A cause the drive from the gearbox to the road wheel to be smooth  
B provide a permanent gear reduction  
C cause one wheel to rotate faster when cornering  
D lock the differential when the road condition is bad
- 

**STOP**  
**GO BACK AND CHECK YOUR WORK**