SECTION A (10 Marks)

Answer **all** questions in this section.

1. For each of the items (i) – (x), choose the correct answer among the given alternatives and write its letter beside the item number in the answer booklet provided.

(i) The cylinder leakage tester applies air pressure to the cylinder with the piston at
A TDC and with both valves closed B BDC and with both valves open
C TDC and with both valves open D BDC and with both valves
E starting the compression stroke.

(ii) What happens when the piston is just about the top of the exhaust stroke?
A The exhaust valve closes while inlet valve opens.
B The exhaust valve closes while inlet valve still opened.
C The inlet valve opens while exhaust valve still opened.
D The inlet valve closes while exhaust valve still closed.
E The inlet valve closes while exhaust valve still opened.

(iii) The air gap between the central electrode and ground (or side) electrode of a spark plug is around
A 0.2 mm B 0.5 mm C 1.5 mm D 2 mm E 1 mm.

(iv) Which of the following is the most commonly used supplementary restraint system (SRS) component?
A Seat belt. B Airbag. C Brake. D Steering. E Site mirror.

(v) The crescent-shaped cavity on the piston head top surface is known as
A piston hole B snap ring C valve clearance D valve recess E opening.

(vi) Two advantages of using helical gears rather than spur gears in transmission system are
A low noise level and high strength B less initial cost and high maintenance cost
C less initial cost and low noise level D high strength and high maintenance cost
E less initial cost and high strength.

(vii) The three basic cylinder arrangements for automotive engines are
A flat, radial and v B in a row, inline and opposed C inline, v and opposed
D v, inline and flat E v, double row and opposed.

(viii) The valve overlap in four stroke petrol engine is approximately equal to
A 120^{o} B 30^{o} C 90^{o} D 60^{o} E 72^{o}.

(ix) Which of the following symptom is caused by a result of brake disc run out?
A Rapid wearing of the brake pad. B Localized wearing of the brake pad.
C Ineffectiveness of the brake. D Judder during braking.
E Ineffectiveness of the hand brake.

(x) The names of the three diagrams in Figure 1 noting from left are
A flywheel, clutch fork and clutch plate
B friction disc, flywheel and clutch plate
C, flywheel, clutch fork and friction disc
D friction disc, cover disc and clutch plate
E friction disc, clutch plate and clutch fork.

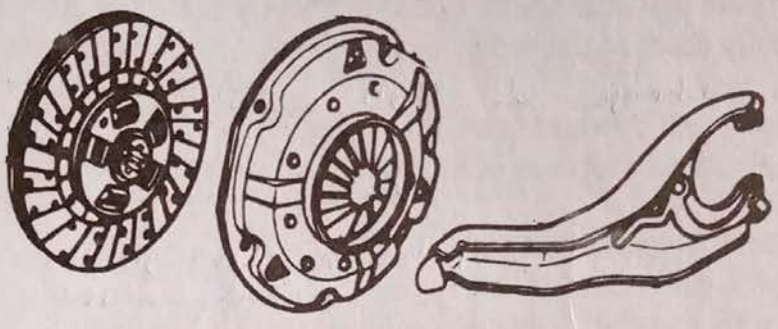


Figure 1

SECTION B (30 Marks)

Answer **all** questions in this section.

2. (a) Mention two main types of jack which are commonly used.
(b) Briefly state the connections of a vehicle hand brake.

3. (a) What is a motor car's chassis?
(b) Briefly explain the main function of the tread pattern on tyre.

4. What are the three main frame 'section-forms' of a motor car?

5. (a) How many revolutions of the crank shaft are required to complete the four stroke cycle?
(b) What are the main uses of stabilizer bars?

6. What are the three common classes of fit?

7. Why mechanics are not allowed to work under a vehicle which is only supported by a jack?

8. (a) What is the common firing order for a four cylinder petrol engine?
(b) What is the main function of float in carburetor?

9. (a) Name two factors which affect dwell angle.
(b) Why hard water is not recommended for cooling system? Briefly explain.

10. (a) What are the basic constituent of a brake-lining materials?
(b) What type of construction is used for most wheels today?

11. Mention three types of lock washers.

SECTION C (60 Marks)

Answer **three (3)** questions from this section.

12. (a) What is meant by a term gear train? **(02 marks)**

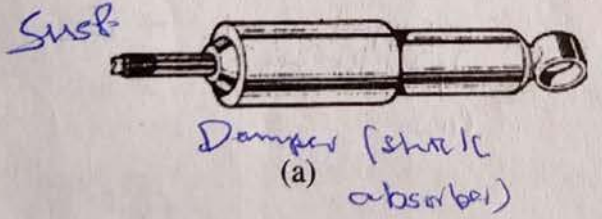
(b) (i) Why are universal joints needed in motor vehicle? Briefly explain. **(06 marks)**
(ii) Briefly describe the sliding or slip joint on the propeller shaft.

(c) (i) Distinguish flywheel from drive plate. **(12 marks)**
(ii) Explain four functions of the drive plate and flywheel.

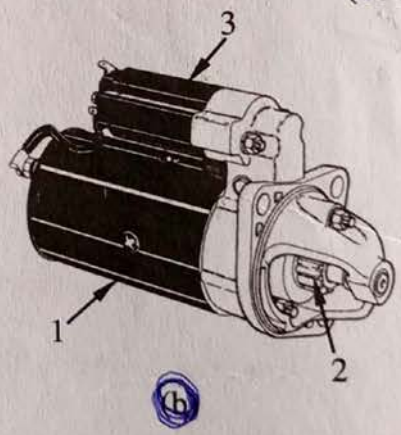
13. (a) (i) What is viscosity? **(06 marks)**
(ii) How is oil viscosity determined?
(iii) In what way does temperature influence oil viscosity?

(b) With the aid of sketch, briefly explain the functions of a wheel cross spanner and reflecting triangle as employed in motor vehicle mechanics. **(08 marks)**

(c) (i) Study the diagrams in Figure 2 (a) and (b) and identify their names as employed in motor car.
(ii) Name the parts of the engine component in Figure 2 (b) indicated by numbers 1, 2 and 3.
(iii) Briefly explain the functions of the components in Figure 2 (a) and (b) as employed in a motor car. **(06 marks)**



(a)



(b)

Figure 2

14. (a) (i) Write the distinction between a bolt and a screw. **(06 marks)**
(ii) Briefly explain how a stud is used.

(b) (i) What is the purpose of the cotter pin? **(04 marks)**
(ii) How is the cotter pin replaced?

(c) (i) What is a rivet? **(10 marks)**
(ii) State three application of the rivet on automotive.

(iii) How can two parts be fixed by using a rivet?
(iv) State the common way of removing the rivet in a place. W/shop Tech.

15. (a) Briefly explain three things a car manufacturer's service manual covers. **(02 marks)**

(b) Describe four steps to be followed in motor vehicle service. **(10 marks)**

(c) Define and briefly explain the cause of the following S.I system effects.
(i) Pre-ignition. (ii) Misfiring. **(08 marks)**

16. (a) (i) Name three basic requirements of any suspension system.
(ii) Why swinging shackle is important in leaf springs? —allow the Pshaft to elongate **(08 marks)**

(b) (i) Give four characteristics of a good brake fluid.
(ii) Elaborate four main advantages which favors high speed vehicle manufacturers to use disk brakes. **(12 marks)**

- Suffer less from brake fade
- FUEL SYSTEMS — PETROL AND DIESEL
- COMPRESSION IGNITION ENGINE (CI)
-