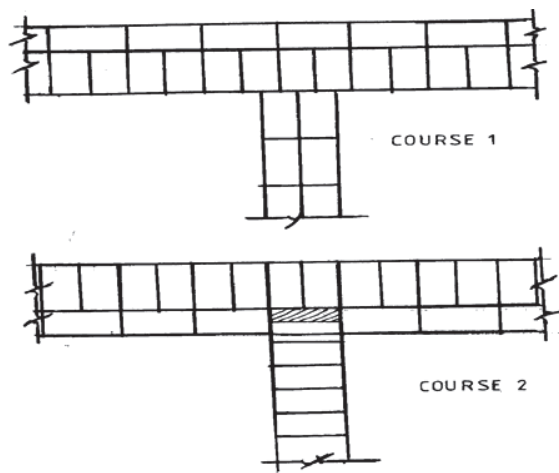


**30.17 BUILDING CONSTRUCTION (446)**

**30.17.1 Building Construction Paper 1 (446/1)**

1. (a) (i) **Peat ground**:- This is a type of ground that is made of decomposed vegetation. (1 mark)
- (ii) **Shelter** is an enclosure meant for exclusion of harsh weather elements and protection against wild animals and thieves. (1 mark)
- (b)
- They are easier to drain.
  - Provides a pleasant view. (2 marks)

2. Bonding details in English bond of a T-junction wall.



(4 marks)

3. (a)
- Existing building.
  - Kerb line.
  - Centre line of the road. (2 x 1/2 = 1 mark)
- (b)
- Keep the mortar bend even and ensure that there are no stones or other projecting agents which may puncture the DPC.
  - Unroll bitumen material carefully to avoid cracks.
  - Bed slates and bricks carefully to ensure that there are no air pockets beneath them.
  - Take care to ensure good bonding between slates or bricks and the mortar.
  - DPC sheet should always be lapped at least 100mm.
  - Ensure that the ground floor DPC has a sound water proof joint with DPC in the walls so that a continuous layer is formed. (4 x 1/2 = 2 marks)
4. (a)
- By tending, cladding, for example:- vertical tile hanging.
  - Constructing a cavity wall. (2 x 1 = 2 marks)
- (b)
- Reveals or doors and window openings.
  - Retaining walls.
  - Internal faces of walls enclosing bundry and dry cleaning areas.
  - On tanking to basements. (4 x 1/2 = 2 marks)

5. (a)
- Demolition of existing buildings.
  - Removal of bushes and trees.
  - Removal of soil to reduce levels.
- (2 marks)**

- (b)
- Cleaning site owing to the reduced amount of spoil which is excavated.
  - Greater speed of construction especially if the holes bored by mechanical means.
  - Work can proceed when the weather makes it difficult for normal excavation of trenches.
- (2 x 1 = 2 marks)**

6. (a)
- No ladder shall be used if there is a missing rung.
  - Every rung shall be properly fixed to the stiles or sides.
  - Every ladder shall have a firm and level footing.
  - A ladder must be secured where necessary to prevent undue sagging or swaying.
  - A ladder shall be securely fixed at its upper resting place.
  - Ladders rising to a vertical height of more than 9.0 m shall be provided with a landing place.
- (4 x 1/2 = 2 marks)**

- (b)
- (i) **Joggel**:- Recessed key filled with suitable material. used between adjacent vertical joint.
- (ii) **Aris**:- Meeting edge of two worked surfaces/or sharp edge of a building unit.
- (iii) **Bonders**:- Through stones or stones penetrating two thirds of the thickness of a wall.
- (3 x 1 = 3 marks)**

7. (a)
- (i) Build up roofing felt. stone chippings mixed with tar. sloping screed.
- (ii) Two coat asphalt. aluminium paint on asphalt. sheet metal work.
- (2 marks)**

- (b)
- Inhaling of dust particles of both cement and lime.
  - Collapsing buildings.
  - Falling objects.
  - Scaling of high heights.
- (2 x 1/2 = 1 mark)**

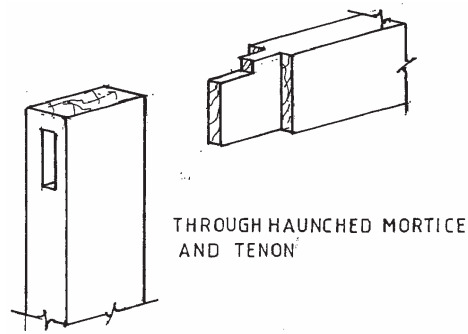
8. (a)
- (i) Tower bolt. **(1/2 mark)**
- (ii) Securing wooden doors and windows. **(1/2 mark)**
- (iii) **A**:- staple.
- B**:- plate.
- C**:- bolt.
- D**:- straps. **(3**

**marks)**

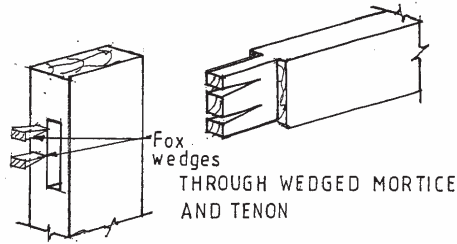
- (b) **Pebbledash**: A rough finish of exposed small pebbles or crushed stone thrown on to a freshly applied coat of mortar.

**Rough coat**: A rough finish produced by throwing on a wet mix containing a proportion of aggregate. **(2 x 1 = 2 marks)**

9. (a)

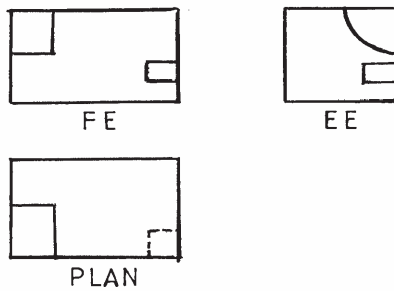


(b)



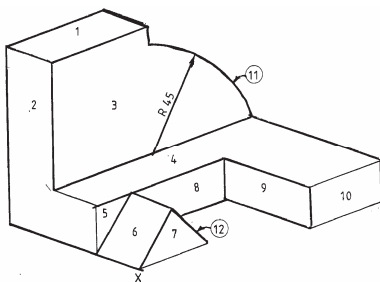
(2 x 2 = 4 marks)

10.



(4 marks)

11.



(15 marks)

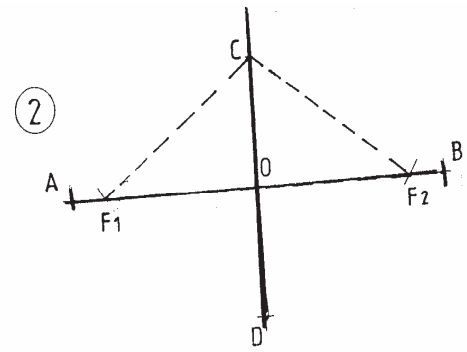
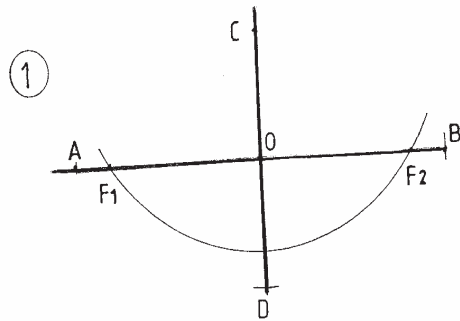
12.

(a)

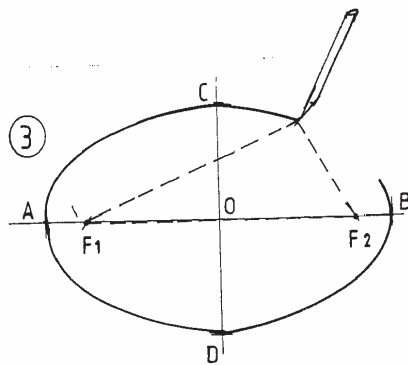
- Strong enough to carry all the load that will be placed upon it.
- Every Scaffold shall be properly maintained.
- The foot of Scaffold shall be on a firm ground.
- Standards shall be vertical and fixed sufficiently close together to secure the stability of the Scaffold.
- Ledgers shall be horizontal and securely fastened to the uprights.
- No part of a building shall be used to support a Scaffold unless that structure is of sound material and good construction.

(Any 4×1=4 marks)

(b)



- Establish the major axis AB and minor axis CD.
- Drive the peg firm into the ground at each end of minor and major axis and perpendicular to each other.
- With C as the centre and radius  $R = AO$ .
- Draw an arch to cut major axis of points  $F_1$  &  $F_2$ .
- Drive pegs at points  $F_1$ ,  $F_2$  and C.
- Tie a string around the three pegs.
- Remove peg C.



- Insert the point of a eg in the loop and draw the ellipse.
- Keep the string taut when moving the peg.

**(11 marks)**

13.

(a)

- The correct pipe size to use.
- Proper selection of correct gradient to use.
- Correct jointing.

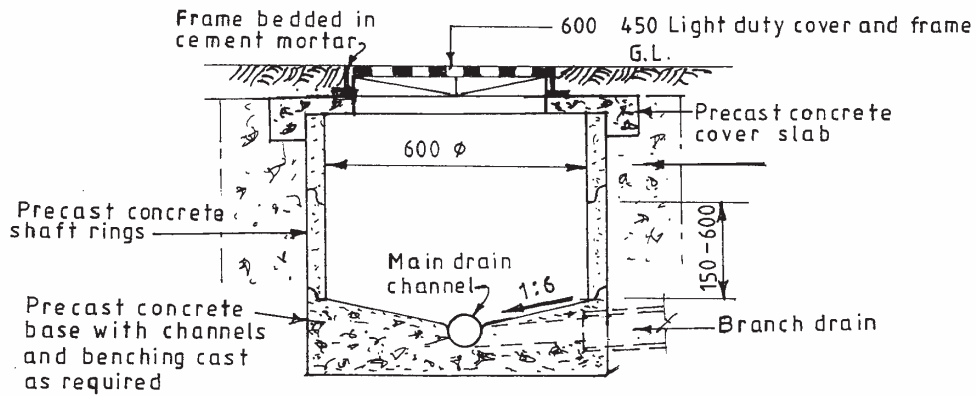
**(2 × 1 = 2 marks)**

(b)

- Easier to join.
- Gutter bolts not required.
- Has self sealing joint due to the joining comp used.
- Corrosion is eliminated.
- Breakages are reduced.
- Better flow properties which usually allow smaller sections and lower falls to be used.

**(5 × 1 = 5 marks)**

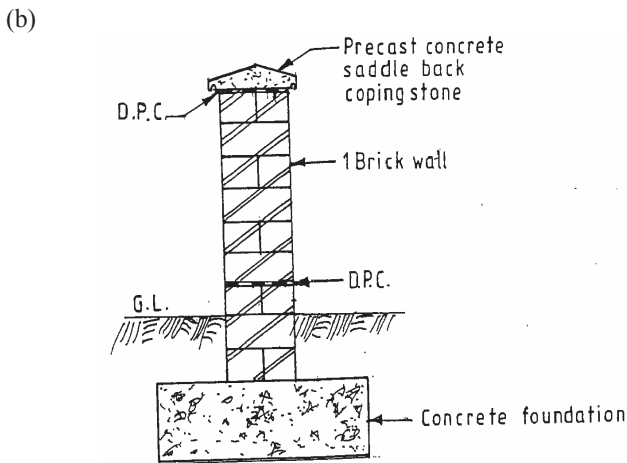
(c)



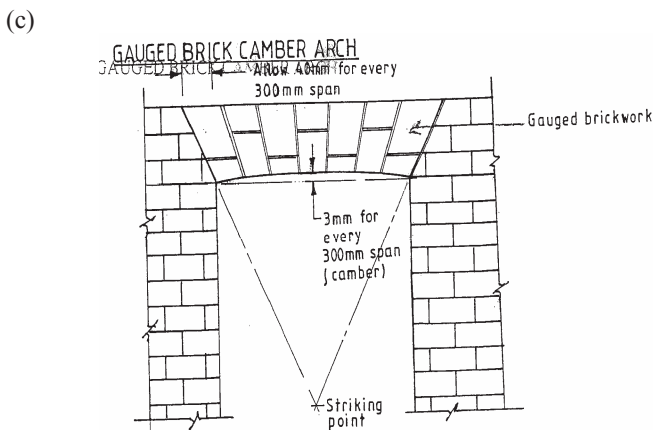
(8 marks)

14. (a)
- To resist lateral thrust of the carriage way.
  - To define carriage way limits.
  - To direct the flow of surface water to gullies.
  - To support and protect footpaths and verges.

(2 × 1 = 2 marks)



(5 marks)



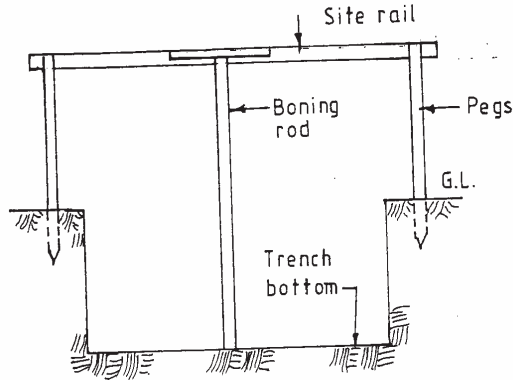
(8 marks)

15. (a)
- Chutes.
  - Hoit.
  - Convey belt.
  - Cranes.

- Stepped platform.
- Mean with karai on linen.

(4 × ½ = 2 marks)

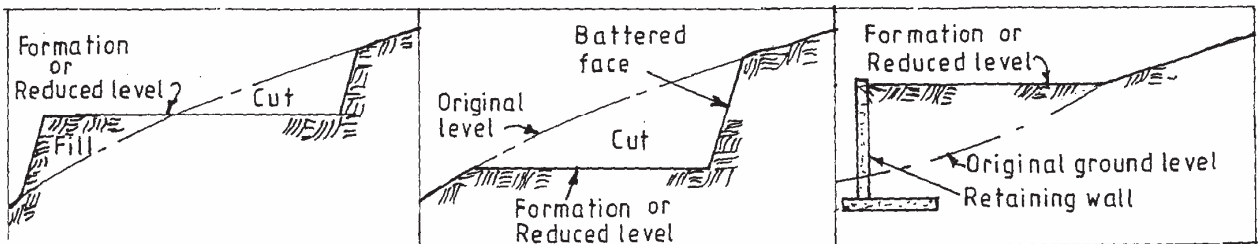
(b)



(4 marks)

(c)

### METHODS OF REDUCING LEVELS



(9 marks)

## 30.18 POWER MECHANICS (447)

### 30.18.1 Power Mechanics Paper 1 (447/1)

1. (a)

- File must have a handle.
- Must be centrally place of work piece.
- User must observe right posture.

(Any 2 × ½ = 1 mark)

(b)

- Auto mechanics.
- Salesman.
- Manager, for example:- workshop, production etc.
- Draftsman.
- Technical teacher.
- Further training.

(Any 4 × ½ = 2 marks)

2.

- (a) (i) **Tachometer**:- used to measure speed of engine revolutions.  
 (ii) **Stethoscope**:- used to detect and locate internal engine noises.

(2)

**marks)**

(b)

- Cork.
- Copper.
- Rubber.
- Asbestos.
- Steel.
- Processed paper.

**(Any 4 x 1/2 = 2 marks)**

3. (a)

- (i) Tab washer.
- (ii) Spring washer.
- (iii) Lock nut.

**(1 1/2**

**marks)**

(b)

- Single rivet lap joint.
- Double rivet lap joint.
- Single strap butt joint.
- Double strap butt joint.

**(Any 4 x 1/2 = 2 marks)**

4. (a)

- Should be fluid at soldering temperature
- Should be able to clean the joint
- Should be easily displaced by molten solder
- Should form a non corrosive residue.

**(4 x 1/2 = 2**

**marks)**

(b)

- Graphite.
- Molybdenum - disulphide.
- Silicon.

**(Any 2 x 1/2 = 1**

**mark)**

5. (a)

- A:-** Cam lift.
- B:-** Nose tip apex.
- C:-** Heel.
- D:-** Base diameter.

**(4 x 1/2 = 2 marks)**

(b)

- Positive circulation is faster.
- Less mass of water needed.
- Smaller and lighter radiator required.
- Small bore water pipes used.
- Water level not critical.
- Engine operating temperature more accurate.

**(Any 2 x 1 = 2 marks)**

6. (a)

- Excessive supply of engine oil.
- Low viscosity of engine oil.
- Late injection timing.
- Worn piston rings.

**(Any 3 x 1 = 3**

**marks)**

- (b)
- Worn brake linings.
  - Air in the hydraulic system.
  - Excessive clearance between linings and drum.
  - Incorrect fluid used.

(Any 2x1=2 marks)

7. (a)
- Reduces wheel scrub.
  - Eases steering effort.
  - Reduces road shock.
  - Reduces tyre wear.
  - Compliments caster angle.

(2x1=2 marks)

- (b)
- Excellent traction especially in hill climbing
  - Compact and accessible power transmission assembly
  - Large passenger space.

(3x1=3 marks)

8. (a) **Cross-ply tyre** has its layers arranged so that each alternate ply lies at different angle to one below while in **radial layers** are parallel. (2 marks)

- (b) (i) Channel.  
(ii) Box.

(2x ½ =1 mark)

9. (a) **Single acting damper** acts in one direction usually or rebound while **double acting acts** on both bump and rebound. (2x1=2 marks)

- (b)
- Surface finish.
  - Load on it.
  - Tyre of material.
  - Speed between surfaces in contact.

(3x ½ =1 ½ marks)

10. (a) (i)



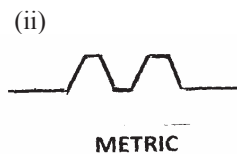
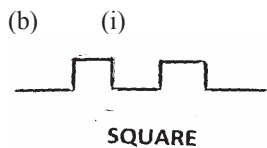
(ii)



(iii)



(3 marks)

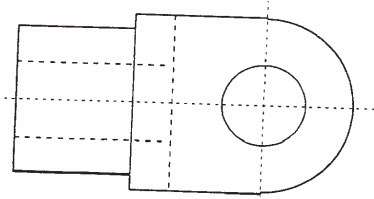
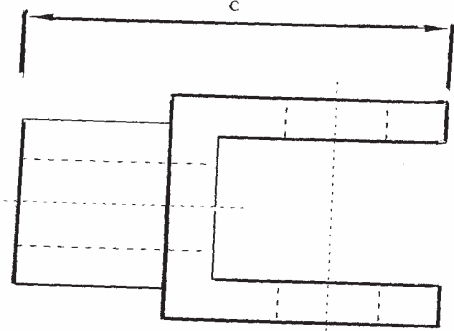
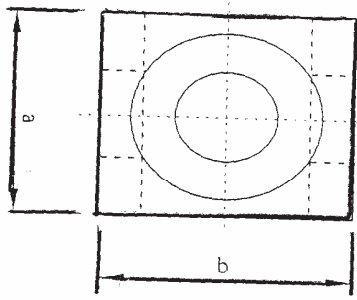


(3 marks)

- 11.

- (a) (b)  
(c)

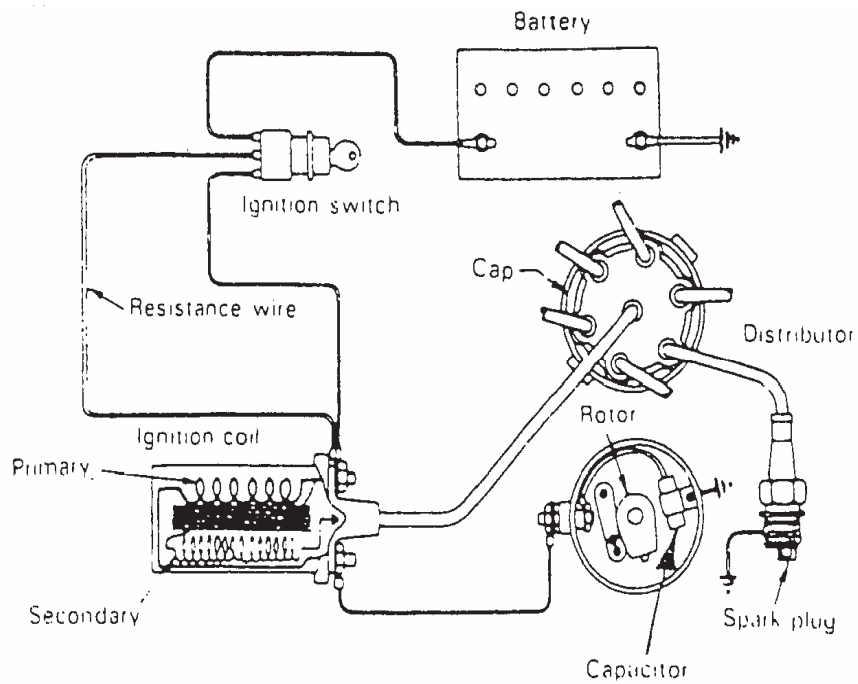




marks)

(15

12.



- When ignition switch is turned on, current flows through the battery (+) terminal to the earth.
- If the distributor c. b. points are open no current flows through the coil and no high voltage current is provided.
- When the starter motor is switched on the c b points will close due to crankshaft rotation and the current flows through the primary circuit of the coil causing the secondary windings to generate magnetic field.
- When the points are open the magnetic field induces a high voltage momentarily in the secondary windings
- The distributor rotor distributes this high voltage to the cylinder at the end of compression stroke thus igniting the mixture in the combustion chamber.

(15

marks)

13. (a) Advantages

- Requires less heat than fusion welding.
- Produces less distorted joint.
- Joints are easier to machine.
- Faster process.

***Disadvantages***

- Ferrous metals produced a different colour from that of base metal when brazed.
- Strength of joints deteriorate at temperatures above 250°C.

**(4 marks)**

(b)

- Inadequate cleaning of the joint.
- Using wrong or insufficient flux.
- Using wrong welding rod.
- Incorrect welding temperature.

**(1x4=4marks)**

(c)

- Obtain and set the welding equipment, clean the two parts to be joined by removing oxide and dirt.
- Place the two part on table. Hold them in position, select the correct filler rod and flux.
- Preheat the two pieces evenly, applying more heat for thicker piece.
- Heat the metal at weld start, play the torch over this part in a circular motion.
- When metal is red hot, heat rod slightly and stock it into the flux.
- Hold the end of the fluxed rod just ahead of the torch. Apply more heat to the metal until the flux and rod start to flow.
- Machine the finished joint if necessary.

**(7 marks)**

14. (a) It is simple in construction.  
It runs more smoothly because of less vibration.  
It is lighter in weight.

**(Any 2x1=2**

**marks)**

- (b) (i) **D:-** Exhaust port.  
**E:-** Transfer port.  
**F:-** Inlet port.  
**G:-** Crankcase.

(ii)

- Piston is moving up.
- Inlet port is open.
- Further movement upwards opens the transfer port and opens the exhaust port.
- Mixture is compressed in c.c. and then ignited to produce power.
- In the crankcase fresh charge flows in through the intake port.
- Opens the exhaust port – exhaust gases escapes.
- Opens the transfer port to allow fresh charge into the combustion chamber.
- Deflector on piston crown direct charge in combustion chamber without mixing with exhaust gases.
- Further movement downward opens the inlet port to allow fresh charge.
- The slight compression in crankcase accelerates admission of charge in the chamber.

**(13 marks)**

15. (a) **U:-**Fuel inlet  
**V:-**Leak of return  
**W:-**Spring  
**X:-**Spindle  
**Y:-**Nozzle  
**Z:-**Seat

**(3 marks)**

- (b) **Operation:** When the standing pressure in the delivery pipe and the injector is exceeded by the pressure built up in the chamber of the injection pump the delivery valve of the pump is forced away from its seat. This higher pressure acts immediately.

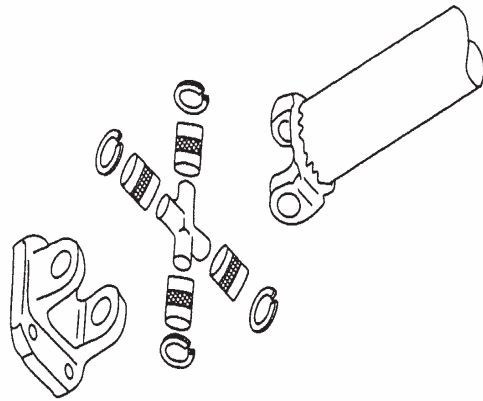
In the Annular space of the injector, and by acting on the face of the needle valve, produces a force which tends to lift the valve away from the seat. When this force exceeds that applied to the valve by the spring, the valve moves away from its seat, and atomised fuel is sprayed into the combustion chamber.

Continued movement of the pump plunger results in uncovering of its spill port. The pressure in the pump chamber collapses. The injector needle returned to its seat by its spring, and the closing of the pump delivery valve by its spring ensures that fuel under a pressure just less than that required for injection is trapped in the pipeline and injector body.

(12 marks)

### 30.18.2 Power Mechanics Paper 2 (447/2)

#### Station 1



(10 marks)

#### Station 3

	<i>Item</i>	<i>Material</i>	<i>Use</i>
A	Exhaust Gasket.	Asbestos with copper or aluminium.	Seals between block and exhaust manifold.
B	O ring.	Neoprene rubber.	Prevents leakage between shafts and housing.
C	Brake fluid.	Vegetable oil.	Transmission of force in braking system.
D	Grease.	Mineral oil.	Lubrication of gears.
E	Oil strainer.	Steel.	Filter oil.

(10 marks)

**Station 6**

<i>Part</i>	<i>Name</i>	<i>Engine System</i>	<i>Identified Fault</i>	<i>Possible Cause</i>
<b>J</b>	Commutator end.	Charging.	Worn carbon.	Normal wear and tear.
<b>K</b>	Mechanical fuel pump.	Fuel.	Inlett valve wrongly installed.	Wrong assembly.
<b>L</b>	Shock absorber.	Suspension.	Worn out.	Excessive use.
<b>M</b>	Engine mounting.	Chasis.	Worn out or broken.	Excessive vibrations.
<b>N</b>	Tie rod end.	Steering.	Worn out.	Rough ride.

**(10****marks)****Station 8**

- (a) Material A: Filler rod used to fill joint when brazing or welding.  
B: Flux used to clean metals and prevents oxidation or corrosion.

**(2****marks)****Station 9**

- (a) (i) Depth of keyway.  
(ii) Length of keyway.

**(2****marks)**

- (b) (i) Diameter of crankpin.  
(ii) Diameter of camshaft.

**(2 marks)**

- (c) Crankshaft teeth.  
Camshaft teeth.

**(4 marks)**

$$\text{Ratio : } \frac{\text{Driven}}{\text{Drive}} = \frac{\text{No. of Camshaft teeth}}{\text{No. of Crankshaft teeth}}$$