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UACE P515/3 Principles and practices of agriculture2 2018

2 hours

Instructions

Answer all questions

1. Specimens A, B, C and D are parts of a tractor.

(a) Using one observable feature on each specimen, explain how the specimen is suitable for its function (04marks)

- A
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- B
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- C
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- D
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(b) Explain how specimens A, B, C and B work together in operation of an engine. (04marks)

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(c) Suggest two ways of maintain the system to which the specimen belong (02marks)

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2. You are provided with specimens E, F and G

(a) Observe the specimens and describe the damage on each of them. (03marks)

E

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F

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G

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(b) Suggest the cause of the damage observed on each specimen in (a)

E

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F

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G

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(c) Suggest two ways in which each of the causal agents of the damage of specimens E and F spread in the field (02marks)

E

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F.....

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(d) Give two cultural methods of controlling each of the causal agents of the damage onspecimen E, F and G (03marks)

E

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F

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G

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3. You are provided with specimen M and N which are fertilizers
 (a) Carry out the following tests on the specimens, record your observations and deductions in Table 1

Table 1

Tests	Observations	Deduction
(i) Put one spatula of M in a test tube, add 2cm ³ of distilled water, shake and leave to settle for 2 minutes and add 3 drops of universal indicator solution Using pH chart, give the pH of the solution		
(ii) Repeat the test in (a)(i) using specimen N		

(b) Basing on your results in (a) suggest with a reason, which of the two specimens would be applied to

(i) Acidic soils (02 marks)

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(ii) Alkaline soil (02marks)

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(c) Suggest two possible effects of applying specimen M to acidic soils

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4. Specimens H, I, and K are common tools on a farm

(a) Describe how the specimens are used together on a farm. (04 marks)

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(b) Using one observable feature on each specimen, describe how it is designed to perform its functions effectively.

H

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I

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J

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K

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(c) Suggest one way of maintain each specimen in good working conditions (02marks)

H

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I

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J

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K

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5. Specimens R and S are animal feeds. You are to carry out tests on the specimens to establish the food nutrients they contain. Put 2 spatulas of R in a mortar and grind it using a pestle. When the contents are fine, transfer into a beaker and add 20cm³ of distilled water, then stir and leave to settle. Decant the extract into a test tube and label it R. Repeat the procedure using specimen S to obtain extract S.

(a) Use the extracts to carry out tests in the table 2 and record your observations and deductions in the table

Table 2

Test	Observations	Deduction
(i) To 1cm ³ of extract R in a test tube, add 3 drops of iodine.		
(ii) Repeat test (i) using extract S		
(iii) To 1cm ³ of extract R in a test tube, add 1cm ³ of Benedict's solution and boil		
(iv) Repeat test (iii) using extract S		
(v) To 1cm ³ of extract R in test tube, add 3 drops of dilute hydrochloric acid, boil and cool. Then add 5 drops of sodium hydroxide solution followed by 1cm ³ of Benedicts solution then boil		
(vi) Repeat test (v) using extract S		
(vii) To 1cm ³ of extract R in test tube, add 1cm ³ of sodium hydroxide solution followed by 3 drops of copper sulphate		
(viii) Repeat test (vii) using extract S		

(b) Suggest the proportions in which you would feed the specimens to a calf which has just been weaned. Give a reason for your answer. (02 marks)

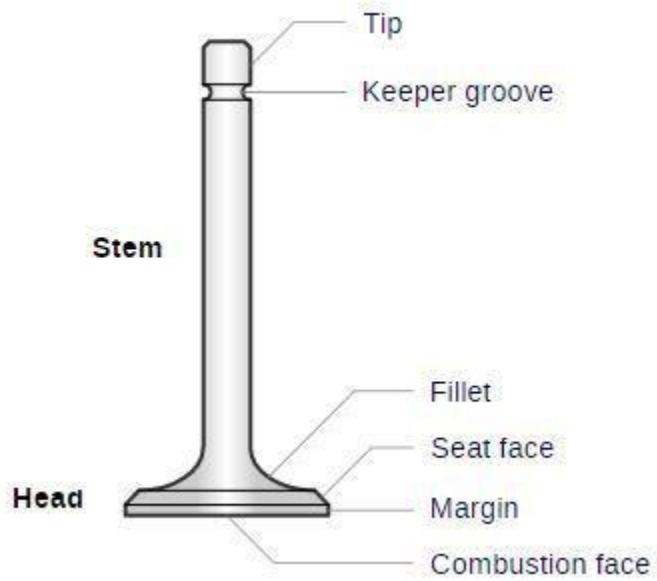
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End

Confidential material

Each student should be provided with

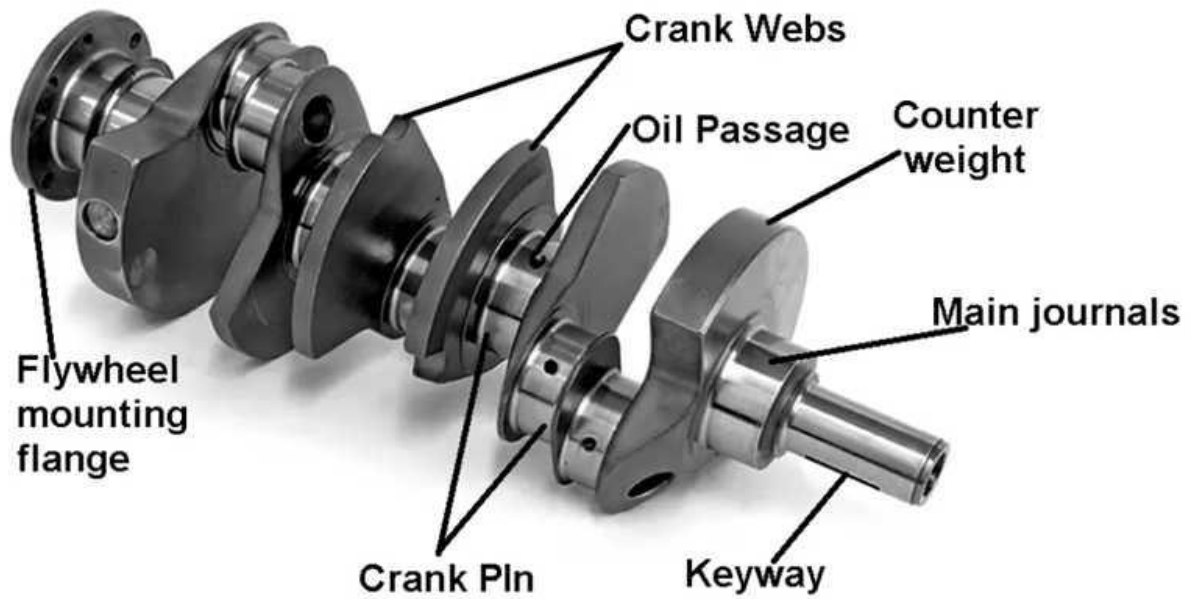
Exhaust valve, labeled A



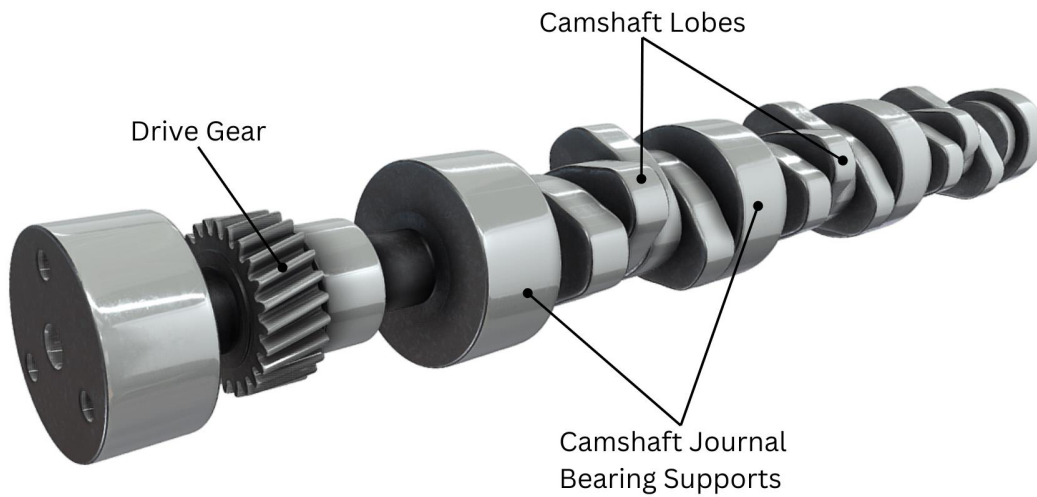
Push rod, labeled B



Crank shaft labeled C



Cam shaft, labeled D



Whole bean plant, including ponds, affected by *Athracnose*, labeled E



Cassava plant with branches and leaves attacked by cassava mosaic labeled F



Maize plant attacked by maize stalk borer, labeled G



Hand trowel, labeled H



Wood dibber, labeled I



Flexible tape measure, labeled J



Watering can, labeled K



1 table spoonful of

Sulphate of ammonia fertilizer, labeled M

CAN fertilizer, labeled N

Maize bran, labeled R

A small piece (about 10g) of ground nut cake, labeled S

5 test tubes

1 beaker (250cm³)

Universal indicator

pH chart

mortar and pestle

spatula

stirrer

dropper

access to

- Reagents used to carry out food test
- Source of heat

Suggested answer

1. Specimens A, B, C and D are parts of a tractor.

(a) Using one observable feature on each specimen, explain how the specimen is suitable for its function (04marks)

A Has tough seal and stem to withstand high temperature and force
Valve face is very smooth to make a tight closing with the valve seat

B Made of tough material to provide necessary strength and durability to withstand stress and temperatures

C Made of tough material to provide necessary strength and durability to withstand stress and load

Smooth to reduce friction

Has internal oil passage to ensure proper lubrication of the bearing and other moving parts

D Has cam for proper timing

Made of tough metal for rigidity

Made of tough metal to reduce the rate of wear

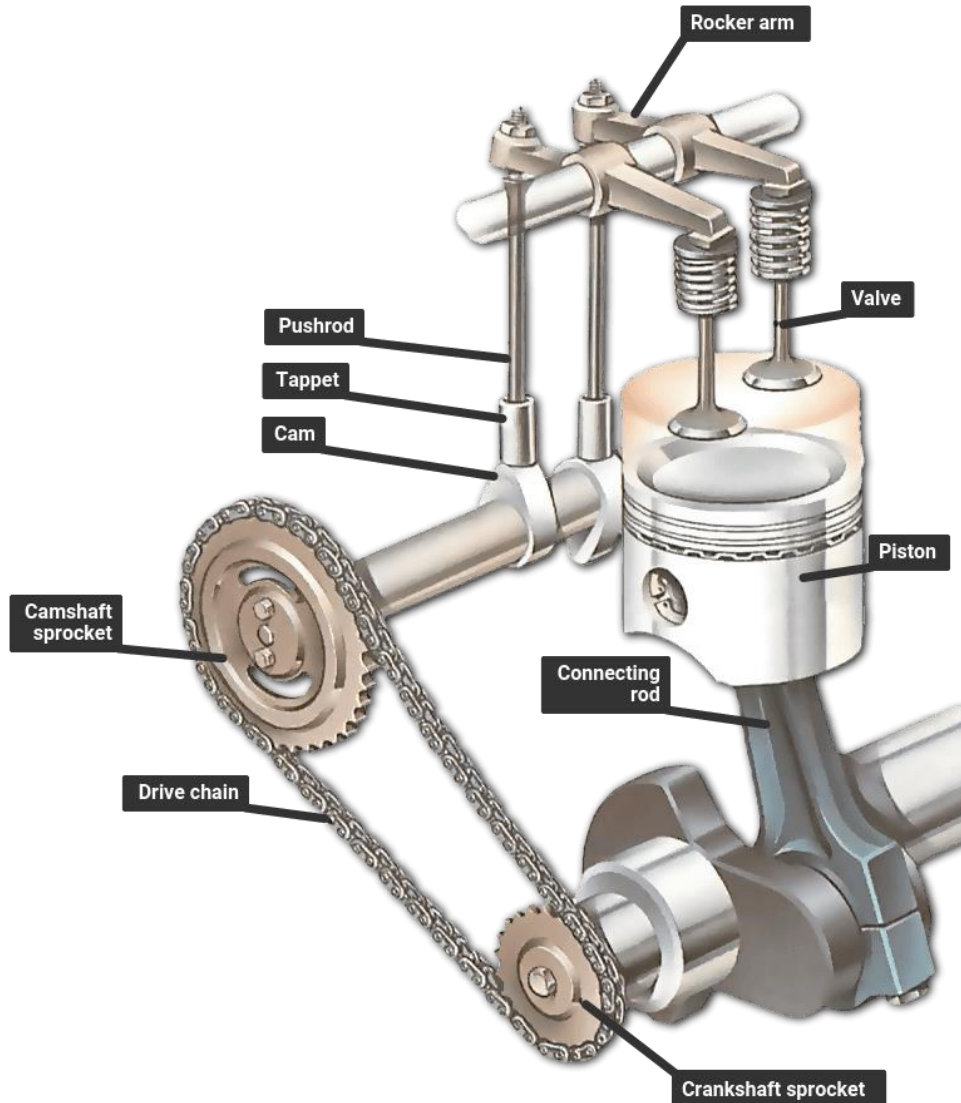
Smooth to reduce friction

(b) Explain how specimens A, B, C and D work together in operation of an engine. (04marks)

Rotation of D (cam shaft) causes the B(push rod) to **actuate the rocker arm and moves the valve**, opening and closing it to allow fuel and air in and exhaust out of the combustion chamber.

Rotation of C (crank shaft) causes movement of the piston

The rotation of D and C is synchronized by timing belt, timing gear or timing chain



(c) Suggest two ways of maintain the system to which the specimen belong (02marks)

Lubricate

Replace worn out parts

2. You are provided with specimens E, F and G

(e) Observe the specimens and describe the damage on each of them. (03marks)

E has Small, irregular yellow or brown spots on leaves and stems and fruits have sunken brown spots

F has mosaic yellow patches and curled leaves

G holes in leaves and stem

(f) Suggest the cause of the damage observed on each specimen in (a)

E -fungus

F mosaic virus

G stalk borer

(g) Suggest two ways in which each of the causal agents of the damage of specimens E and F spread in the field (02marks)

E spores are dispersed by wind

F- spread by whiteflies and infected cuttings

(h) Give two cultural methods of controlling each of the causal agents of the damage on specimen E, F and G (03marks)

E – destroying/burying infected plants

- growing cuttings from resistant varieties

F – destroying/burying infected plants

- growing cuttings from resistant varieties

- Use drip irrigation instead of overhead watering to keep foliage dry.

G - Remove and destroy crop residues after harvest to eliminate overwintering larvae.

- Plant resistant varieties

- Intercrop maize with desmodium (a repellent plant) and nippier grass (a trap crop)to lure the insect away from maize

3. You are provided with specimen M and N which are fertilizers

(d) Carry out the following tests on the specimens, record your observations and deductions in Table 1

Table 1

Tests	Observations	Deduction
(iii) Put one spatula of M in a test tube, add 2cm ³ of distilled water, shake and leave to settle for 2 minutes and add 3 drops of universal indicator solution Using pH chart, give the pH of the solution	Universal indicator turn light green pH 5 -6	M is acidic
(iv) Repeat the test in (a)(i) using specimen N	Universal indicator solution turn green (pH = 7)	N is neutral

(e) Basing on your results in (a) suggest with a reason, which of the two specimens would be applied to

(i) Acidic soils (02 marks)

N because it is neutral does not lower pH

(ii) Alkaline soil (02marks)

M – because it is acidic thus neutralizes alkaline soil

(f) Suggest two possible effects of applying specimen M to acidic soils

- Lowers pH
- High salinity that can cause death of plants

4. Specimens H, I, and K are common tools on a farm

(a) Describe how the specimens are used together on a farm. (04 marks)

They are used together during transplanting

Uses of H (hand trowels)

- Breaking up soil in small areas
- Removing weeds
- Pull up seedling
- Applying fertilizer or compost
- Removing long-rooted plants

Uses of I (wooden dipper)

- Making holes to sow seeds in.
- Firming in seedlings when pricking out.
- Make holes to put stem or root cuttings in (so the cutting isn't damaged by being forced in).
- Making holes through plastic woven membrane mulches to plant out seedlings.

Uses of J (tape measure)

- Used to measure spacing

Uses of K

For watering transplanted seedlings

(b) Using one observable feature on each specimen, describe how it is designed to perform its functions effectively.

H – it blade has sharp edges to cut through soil

- has handle for easy maneuvering

- I - has a pointed end that can be used to make holes in the ground
 - has markings to help gardeners plant seeds at the correct depth.
 - has handle for easy maneuvering

J- has marking for length

K –has nozzle sprinkler to break water into spray and distribute water evenly

- has vessel to carry water
- has a hand for carrying
- sprout to direct water

(c) Suggest one way of maintain each specimen in good working conditions (02marks)

H –cleaning, oiling and store in cool place to prevent rusting of metal part,

I - cleaning, oiling and store in cool place to drying out and cracking,

J - cleaning and storing in dry place

K - cleaning and storing in dry place

5. Specimens R and S are animal feeds. You are to carry out tests on the specimens to establish the food nutrients they contain. Put 2 spatulas of R in a mortar and grind it using a pestle. When the contents are fine, transfer into a beaker and add 20cm³ of distilled water, then stir and leave to settle. Decant the extract into a test tube and label it R. Repeat the procedure using specimen S to obtain extract S.

(c) Use the extracts to carry out tests in the table 2 and record your observations and deductions in the table

Table 2

Test	Observations	Deduction
(i) To 1cm ³ of extract R in a test tube, add 3 drops of iodine.	Black color formed	Starch present
(ii) Repeat test (i) using extract S	No color change	Starch absent
(iii) To 1cm ³ of extract R in a test tube, add 1cm ³ of Benedict's solution and boil	Color remains blue	Reducing sugars absent
(iv) Repeat test (iii) using extract S	Color remains blue	Reducing sugars absent
(v) To 1cm ³ of extract R in test tube, add 3 drops of dilute hydrochloric acid, boil and cool. Then add 5	Color remains blue	Non-Reducing sugars absent

	drops of sodium hydroxide solution followed by 1cm ³ of Benedicts solution then boil		
(vi)	Repeat test (v) using extract S	Color remains blue	Non-Reducing sugars absent
(vii)	To 1cm ³ of extract R in test tube, add 1cm ³ of sodium hydroxide solution followed by 3 drops of copper sulphate	Turn purple	Proteins present
(viii)	Repeat test (vii) using extract S	Turn deep purple	Much proteins present

(d) Suggest the proportions in which you would feed the specimens to a calf which has just been weaned. Give a reason for your answer. (02 marks)

1:1 to provide enough proteins for growth

End

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Thanks

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