

FIJI NATIONAL UNIVERSITY
COLLEGE OF AGRICULTURE, FISHERIES AND FORESTRY
FINAL EXAMINATION: 2013
B. Sc. IN AGRICULTURE TRIMESTER (SPECIAL EXAM)

CODE AEG 601: Farm Mechanization and Machinery

DATE:

TIME:

TOTAL MARKS: 100

TIME ALLOWED: 3:10 HOURS

INSTRUCTIONS:

- This paper consists of **Three (3) pages.**
 - **Answer questions in the answer booklet.** Number your answers correctly in the answer.
 - You are allowed 10 minutes Extra reading time during which you are NOT to write.
 - Begin each answer on a fresh page and use both sides of the sheet.
 - Do not write your name on any answer sheet - only write your examination number/Student ID.
 - For all sheets of paper of which rough/draft work has been done, cross it through and you MUST ATTACH to your answer scripts.
 - Write clearly the number(s) of the question(s) attempted on the top of each sheet.
 - ATTEMPT ALL SECTIONS
 - TOTAL MARKS = 100

 - **"MOBILE PHONES ARE STRICTLY NOT ALLOWED"**
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SECTION A. Fill in the blank.

(6 x 1.5 = 12 Marks)

1. An average capacity of a wind mill would be about hp.
2. Power operated sprayer machines generally operating at pressure ranging from kg/cm².
3. Generally, it is recommended that; change the primary fuel filter in every hours.
4. Shoe type furrow opener is specially suited for soil.
5. The of M B Plough are made of chilled cast iron or steel.
6. If a straight edge is placed under the point of the share and the landside, a clearance of 0.3 to 0.5 cm should be measured. It is known as the suction of the plough.

SECTION B. Choose the best answer

(4 x 1.5 = 6 Marks)

1. The pressure applied to a liquid in a closed container is transmitted with equal intensity throughout the liquid and at right angles to the surface of the container, is known as
 - a. Pascal's law
 - b. Newton's law
 - c. Pressure law
 - d. None of above
2. Which of following is not a component of seed drill.
 - a. Seed box
 - b. Furrow openers
 - c. Transport wheels
 - d. Scraper
3. Tool steel softened by heating and cooling very gradually is called
 - a. Tempering
 - b. Annealing
 - c. Cooling
 - d. None of above
4. Which of following is not a true formula.
 - a. $F.H.P = I.H.P - B.H.P$
 - b. $I.H.P = B.H.P + F.H.P$
 - c. $I.H.P = B.H.P - F.H.P$
 - d. $B.H.P = I.H.P - F.H.P$

SECTION C. True or Flash

(4 x 1.5 = 6 Marks)

1. Shovel type furrow openers are best suited for stony or root infested fields.
2. Under a single cropping pattern, it is normally recommended to consider one hp for every one hectare of land.
3. The disc angle of vertical disc plough is in the range of 15 to 25 degree.
4. The power available at the end of the drawbar is known as Indicated horse power of tractor.

SECTION D. Short answer questions (ATTEMPT ANY SIX (6) QUESTIONS).

(6 x 6 = 36 Marks)

1. Write any five component of tractor.
2. What do you mean by Harrowing? Classify the different type of Harrow used in secondary tillage operation.
3. Write the advantage and disadvantage of Mechanical Power.
4. What do you mean by Hand Tool? Write the three techniques used to connect working parts with handle.
5. Define the Seed Drill and write its functions.
6. Define the sprayer and what are the purposes of sprayer machine?
7. Define the following terms
 - a. Stroke
 - b. I.H.P
 - c. Draft

SECTION E. Long answer question. (ATTEMPT ANY FOUR (4) QUESTIONS).

(4 x 8 = 32

Marks)

1. Define the tillage and write the different objectives of tillage.
2. With a neat sketch, define the disc angle; tilt angle and concavity of disc plough.
3. Write the procedure for selection of suitable tractor?
4. Define the primary and secondary tillage operation and write the name of least two implements of used these tillage operations.
5. Define the following term;
 - a. Bore
 - b. Unit Draft
 - c. Draft control unit
 - d. Theoretical Field Capacity
 - e. Compression Ratio

SECTION F. Problem based on Calculation. (ATTEMPT ANY One QUESTIONS)

(1 x 8 = 8 Marks)

1. A Four cylinder four stroke diesel engine has a cylinder diameter of 27 cm, stroke length 15 cm, clearance volume 4508 cm^3 , engine speed 450 rpm, mean effective pressure 6.8 kg/cm^2 and mechanical efficiency is 80%. Calculate (i) IHP, (II) BHP (iii) Compression ratio and (iv) Swept volume.

2. Calculate the cost of operation of a 35 HP tractor per hour and HP hour. Initial cost is F\$ 80,000; life of the tractor is 10 years; number of working hours are 1200 per year; interest on the capital is 10%; cost of the diesel is F\$ 2.50 per litre; fuel consumption is 5 litres per hour; wages of the driver is F\$ 5; lubricants cost is 35% of the fuel cost; repairs and replacements is 10% of initial cost; housing, taxes and insurance is 1.5% each of the initial cost.

*****END*****