



**UNIVERSITY OF ESWATINI
RESIT EXAMINATION PAPER**

PROGRAMME: BSC AGRON. II
BSC AGRIC EXT. II
BSC ANI. SC. II
BSC ANI. SC. (DAIRY) II

COURSE CODE: ABE208

TITLE OF PAPER: PRINCIPLES OF FARM MECHANISATION

TIME ALLOWED: TWO (2) HOURS

SPECIAL MATERIAL REQUIRED: NONE

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY TWO OTHER QUESTIONS.

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SECTION I
COMPULSORY

QUESTION 1 [40 MARKS]

- a) Traditionally, farmers in the southern African region have used solar energy as a source of energy. What processes have used solar energy to accomplish agricultural tasks in Eswatini? [10 marks]
- b) List any five power transmission systems and five power transformation systems. [10 marks]
- c) A three bottom plough is drawn by a tractor during ploughing. The field is ploughed at 5 kmph. The specific resistance of the soil to ploughing at 300 mm depth is 21.33 kN/m of width of cut. If each bottom is 45 cm wide, calculate
- (i) the total width of cut. [4 marks]
 - (ii) The draught force on the implement. [4 marks]
 - (iii) The drawbar power required to pull the plough. [8 marks]
 - (iv) The minimum engine power if drawbar power is 80% of engine power. [4 marks]

SECTION II – ANSWER ANY TWO QUESTIONS

QUESTION 2 [30 MARKS]

- a) Briefly outline the operations involved in conventional tillage. [10 marks]
- b) Name any five objectives of tillage. [10 marks]
- c) Discuss the advantages of using disc ploughs in arid and semi-arid areas of tropical and subtropical regions of Africa? [10 marks]

QUESTION 3 [30 MARKS]

- a) Figure 1 shows an arrangement for motion transmission between point A and point D in a machine. Input shaft A rotates and makes its gear to drive gear B. Gear C rotates with gear B as it is on the same shaft. Gear C drives gear D on the output shaft. Calculate
- The gear ratios between
 - A and B [4 marks]
 - C and D [4 marks]
 - A and D [4 marks]
 - The speed of the output shaft at D if the input speed at A is 1500 rpm. [4 marks]

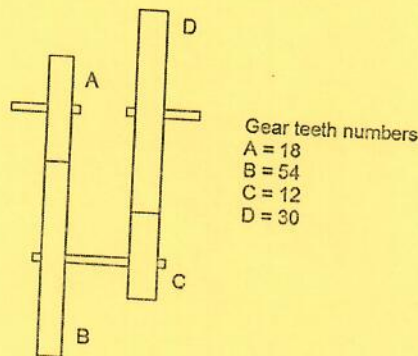


Figure 1 A gear train for motion transmission.

- What processes are carried out by the planter during planting of seeds? [10 marks]
- Distinguish between dusters and sprayers as equipment for plant protection [4 marks]

QUESTION 4 [30 MARKS]

- Distinguish between "elimination" and "judging" processes in the selection of draught animals for agricultural operations [4 marks]
- What factors are considered during elimination of draught animals at the selection process? [12 marks]
- Distinguish between controls and instruments/indicators of agricultural tractors. [4 marks]
- Name examples of five controls and five instruments/indicators of agricultural tractors. [10 marks]