FEDERAL UNIVERSITY OF TECHNOLOGY OWERRI
SCHOOL OF ENGINEERING AND ENGINEERING TECHNOLOGY
AGRICULTURAL AND BIO-RESOURCES ENGINEERING DEPARTMENT
2017/2018 RAIN SEMESTER EXAMINATION. Date. 31/8/2018. Time: 3 hours
Course: PME 510. FARM POWER AND MAINTENANCE (3units)

Instruction: ANSWER FIVE (5) QUESTIONS

QUESTION ONE

a) A 4WD tractor with a total weight of 135KN is pulling a level drawbar load of 55.0KN on a concrete track. The actual travel speed is 11km/hr and the no load travel speed is 11.40km/hr. The axle power is 180KW. Calculate
   (i) The travel reduction
   (ii) Dynamic traction Ratio.
   (iii) Tractive efficiency.

b) Write short notes on the following terms
   (i) Ballasting
   (ii) 'Slip'
   (iii) Dynamic Traction Ratio
   (iv) Tractive Efficiency

QUESTION TWO

a) A tractor with a total weight of 28.5KN has a front wheel reaction of 9.0KN when the tractor is sitting on a horizontal surface. The wheel base is 2083mm. Calculate;
   (i) The horizontal distance from the rear axle centerline to the centre of gravity.
   (ii) The rear wheel reaction.
   (iii) What type of drive is this tractor?

b) Explain five (5) basic maintenance guidelines for all tractors.

QUESTION THREE

a) A Massey Fergusson 1035 diesel tractor has five cylinders, four stroke engine. (One power stroke for every two revolutions). Cylinder bore = 108.9mm, stroke = 157mm, compression ratio = 16.5:1, engine speed = 1500rpm, Horse power = 32hp.
   Calculate;
   (i) Piston displacement
   (ii) Displacement volume
   (iii) Piston speed
   (iv) Stroke- bore ratio

b) Define the following engine terms and give their mathematical expressions.
   (i) Stroke-bore Ratio.
   (ii) Compression ratio
   (iii) Piston displacement.
   (iv) Displacement volume
   (v) Piston Speed.