



Province of the
EASTERN CAPE
EDUCATION

DIRECTORATE SENIOR CURRICULUM MANAGEMENT (SEN-FET)

HOME SCHOOLING SELF-STUDY WORKSHEET

SUBJECT	FITTING AND MACHINING	GRADE	12	DATE	JULY 2020
TOPIC	SYSTEMS AND CONTROL (DRIVE SYSTEMS) (SPECIFIC)	TERM 1 REVISION	()	TERM 3 CONTENT	(√)
TIME ALLOCATION	2 hrs.	<u>TIPS TO KEEP HEALTHY</u>			
INSTRUCTIONS	This topic focused study material is intended to assist learners in the various approaches used by examiners.	1. WASH YOUR HANDS thoroughly with soap and water for at least 20 seconds. Alternatively, use hand sanitizer with an alcohol content of at least 60%. 2. PRACTICE SOCIAL DISTANCING – keep a distance of 1m away from other people. 3. PRACTISE GOOD RESPIRATORY HYGIENE: cough or sneeze into your elbow or tissue and dispose of the tissue immediately after use. 4. TRY NOT TO TOUCH YOUR FACE. The virus can be transferred from your hands to your nose, mouth and eyes. It can then enter your body and make you sick. 5. STAY AT HOME.			

QUESTION 1

- 1.1 State THREE advantages of a belt drive system.
- 1.2 Describe the principle of operation of a gear drive.

QUESTION 2 A hydraulic system is being used to move machine parts during the assembling process. The specifications of the system are diagrammatically presented in FIGURE 1

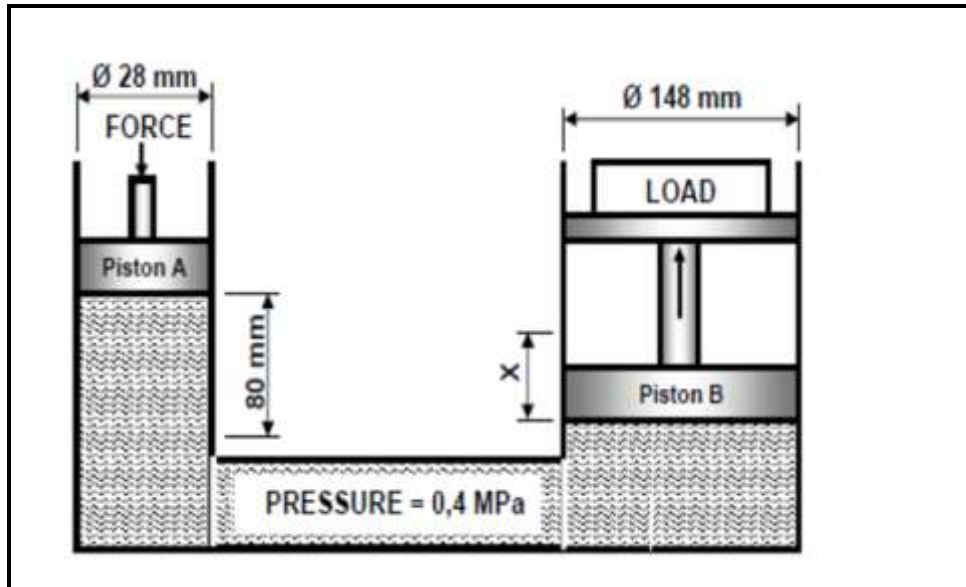


FIGURE 1

Calculate the following:

- 2.1 The force applied to piston A
- 2.2 The distance X, in millimetres, that piston B will move with 10 strokes of piston A

QUESTION 3 Hydraulic system:

The diameter of a piston is 120 mm and the pressure in the cylinder is 1,2 MPa. Calculate the force during the effective stroke.

QUESTION 4

State TWO functions of the reservoir in a hydraulic system.

QUESTION 5

Draw the symbols for the following hydraulic components used in a hydraulic flow diagram:

3.1 Electrical motor

3.2 Pressure gauge

QUESTION 6

A power saw's motor has a pulley, 125 mm in diameter, that turns at 1100 rpm. The speed at which the driven pulley drives the saw blades is 375 rpm.

Calculate the diameter of the driven pulley.

QUESTION 7

FIGURE 2 below shows a belt drive system with a 230 mm driver pulley rotating at 1 440 r/min. The effective tensile force in the system is 165 N.

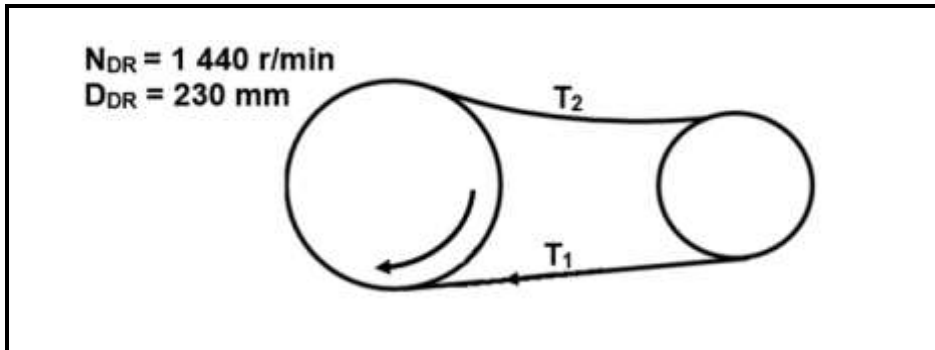


FIGURE 2

With reference to Figure 2 above, determine in 7.1 and 7.2 by means of calculations:

7.1 The belt speed in m.s-1

7.2 The power transmitted in kW.

7.3 Give TWO advantages of belt drives.

QUESTION 8

FIGURE 3 below indicates a gear system in a gearbox. Gear A with 102 teeth rotates clockwise at 120 r/min.

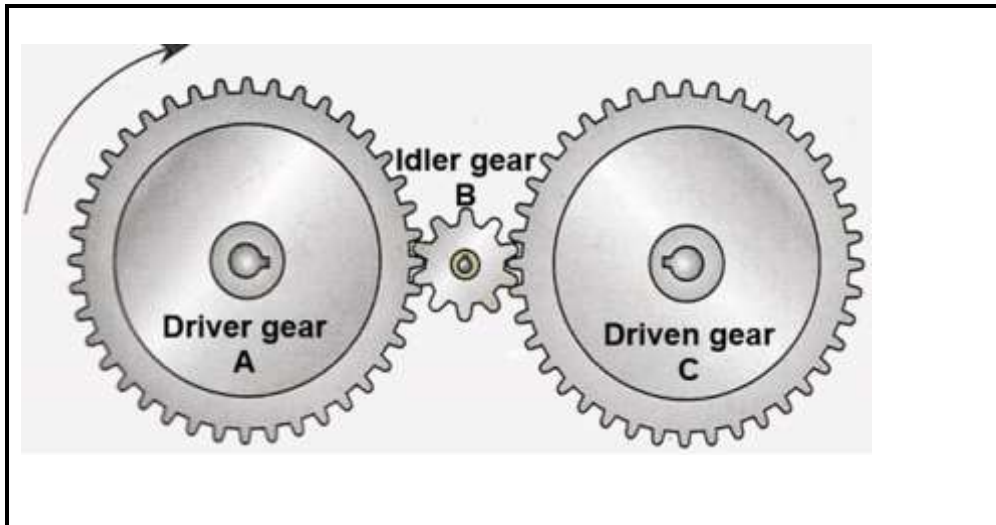


FIGURE 3

8.1 Determine the direction of rotation of driven gear **C** if driver gear **A** rotates clockwise, as indicated in FIGURE 2.

8.2 Calculate the number of teeth on gear **C** if it needs to rotate at 80 r/min.

8.3 What is the function of the idler gear (B) as indicated in Figure 3 above?

QUESTION 9 Compound Gear System.

FIGURE 4 below shows a gear drive system. A driver gear on the shaft of an electric motor has 24 teeth and meshes with a gear on a counter shaft with 40 teeth. On this counter shaft is another driver gear with 20 teeth that meshes with a gear with 48 teeth on a second counter shaft. The second counter shaft has a driver gear with 42 teeth which drives a gear with 90 teeth on the output shaft.

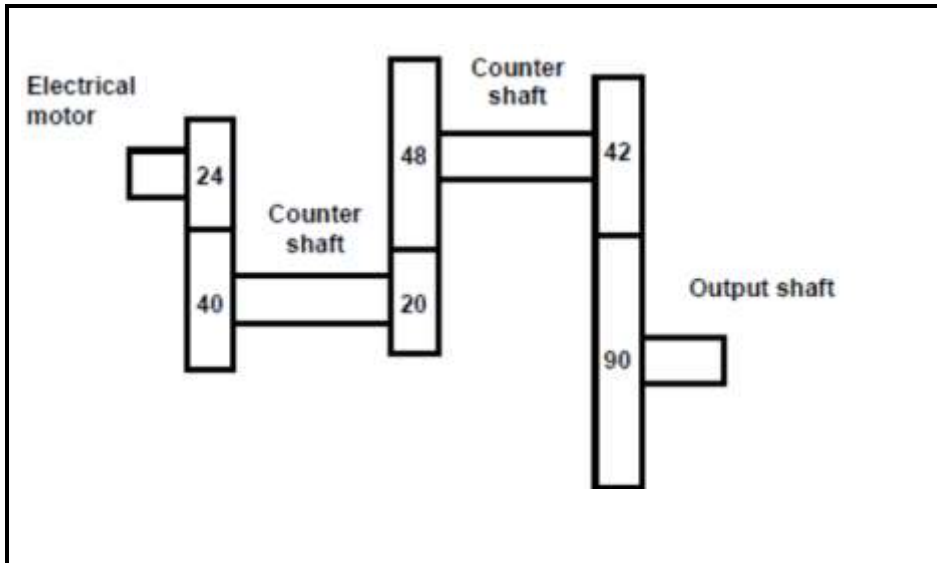


FIGURE 4

Calculate the following:

9.1 The rotational frequency of the output shaft if the electric motor rotates at 1440 r/min.

9.2 The velocity ratio between the input and output shaft.

QUESTION 10

Derive the units for Torque.

QUESTION 11

The chain drive system of a bicycle is shown in FIGURE 5 below. Calculate the gear ratio of the system.

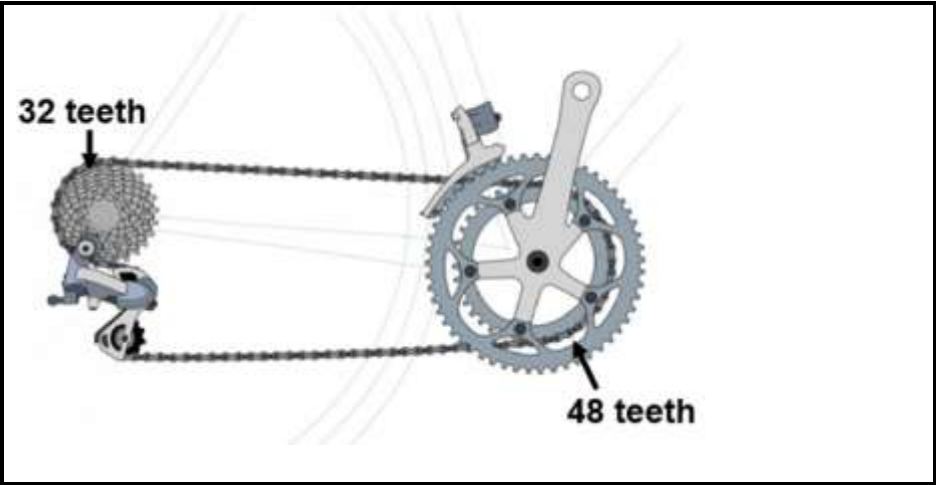


FIGURE 5