



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 TWO advantages of a belt drive system compared to a chain drive system.

QUESTION 2

Study FIGURE 1 below. An artisan was instructed to design a hydraulic system that will be used to press out bearings. The force that should be exerted on the bearing is 18 kN. The maximum force exerted on the 32 mm plunger is 120 N.

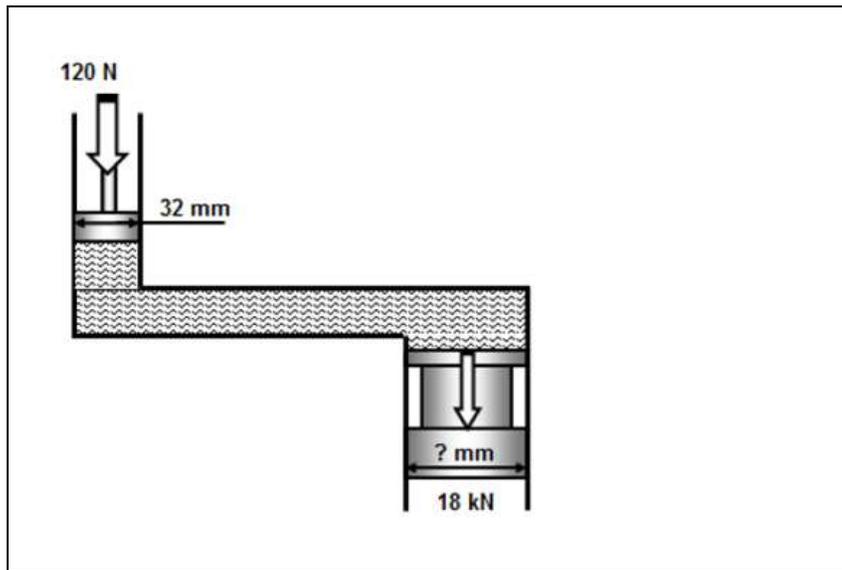


FIGURE 1

Calculate the following:

2.1 The fluid pressure in the hydraulic system.

2.2 The diameter of the ram so that the maximum force of 18 kN can be exerted on the bearing.

QUESTION 3 A hydraulic system is used to remove parts from a machine. The specifications of the system are indicated in FIGURE 2 below.

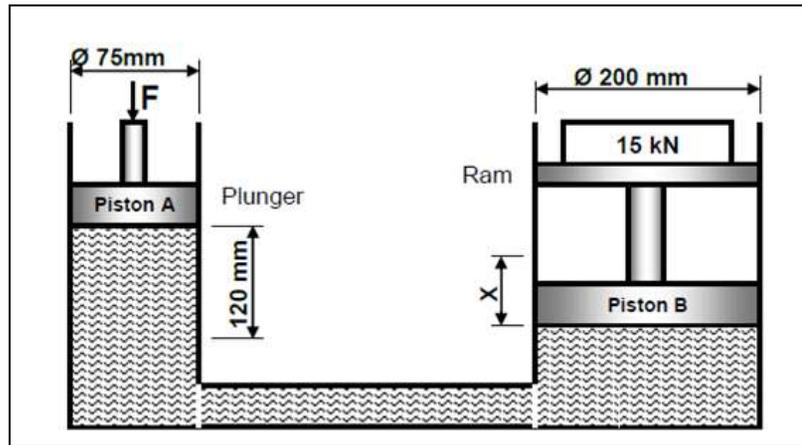


FIGURE 2

Calculate the following:

3.1 The fluid pressure in the hydraulic system in kPa.

3.2 Distance **X**, in millimetres, that piston **B** will move with ONE stroke of piston **A**.

QUESTION 4

Draw the symbol for a one-way spring-loaded valve used in a hydraulic flow diagram.

QUESTION 5

State TWO advantages of pneumatics when compared with hydraulics.

QUESTION 6

The driven pulley of a belt drive system must rotate at a speed of 80 r/min. The driven pulley has a diameter of 240 mm and the driver pulley a diameter of 75 mm. Calculate the rotation frequency of the driver pulley in r/min.

QUESTION 7

An electric motor with a 250 mm diameter driver pulley rotates at 24 r/s. The motor drives a pulley with a diameter of 350 mm with the help of a flat belt. The tensile force in the tight side of the belt is 300 N and in the slack side 120 N.

7.1 Draw a neat labelled sketch of the system showing the driver and driven pulley.

7.2 Calculate the belt speed in m/s.

7.3 Calculate the power transmitted in kW.

QUESTION 8

FIGURE 3 below shows a compound gear train. A driver gear on the axle of the electric motor has 30 teeth that mesh with a gear on the counter shaft with 80 teeth. On the counter shaft is another driver gear with 40 teeth that mesh with a gear with 60 teeth. The rotation frequency is 120 r/min.

Calculate the rotation frequency of the electric motor.

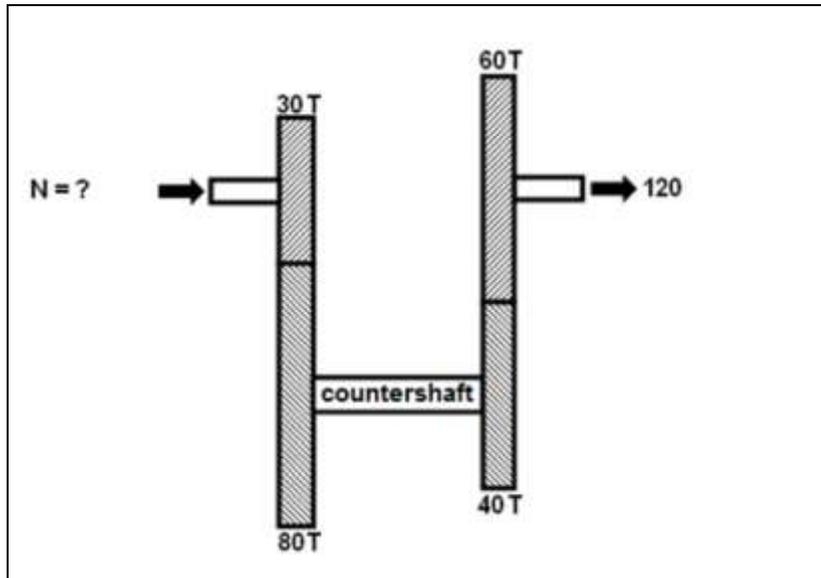


FIGURE 3

QUESTION 9

Study FIGURE 4 below. The gear box of a motor vehicle is in second gear. The input shaft rotates at 3 000 r/min. The input shaft is equipped with driver gear A with 20 teeth, which mesh with gear B with 35 teeth. The second acceleration gear C on the countershaft has 25 teeth and meshes with the final driven gear D with 30 teeth.

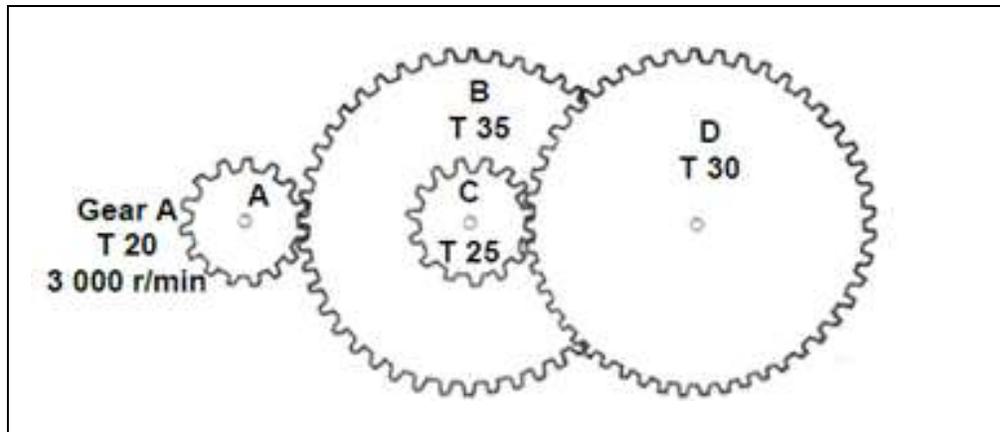


FIGURE 4

Calculate:

9.1 The rotation frequency of the output shaft in revolutions per second.

9.2 The gear ratio.

QUESTION 10

A force of 250 N moves an object over a distance of 15 m. Calculate the work done by this force.