ELIZADE UNIVERSITY, ILARA-MOKIN,
ONDO STATE, NIGERIA
DEPARTMENT OF MECHANICAL ENGINEERING

SECOND SEMESTER EXAMINATIONS

2017/2018 ACADEMIC SESSION

HOD'S SIGNATURE

COURSE: MEE 304: Engineering Drawing (Computer Aided Design) (3 Units)

CLASS: 300 Level Mechanical & Automotive Engineering

TIME ALLOWED: 2½ hours

INSTRUCTIONS: Answer any four questions

Unless otherwise stated, all dimensions are in mm

Date: July/August, 2018

Question 1

a) Describe ***Solid Modeling*** as a Geometric Modeling technique and highlight five inherent mathematical properties it should capture

b) Use Figures Q1a and b to illustrate the difference between ***Geometry*** and ***Topology***

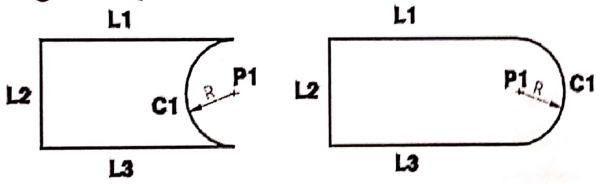


Figure Q1a

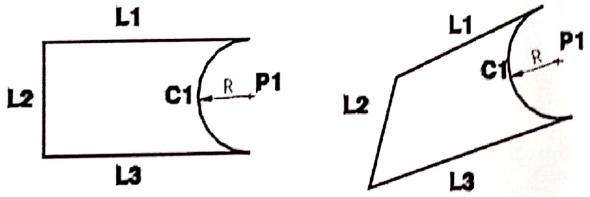


Figure Q1b

c) Explain the functions of each of the following Geometric Constraints used in PTC Creo Parametric Sketcher

Question 2

Describe how you will model and assemble the wheel support assembly of Figure Q2 using Pro/E

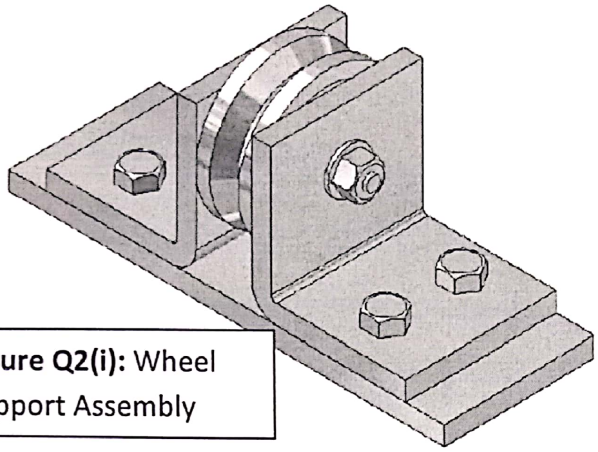


Figure Q2(i): Wheel Support Assembly

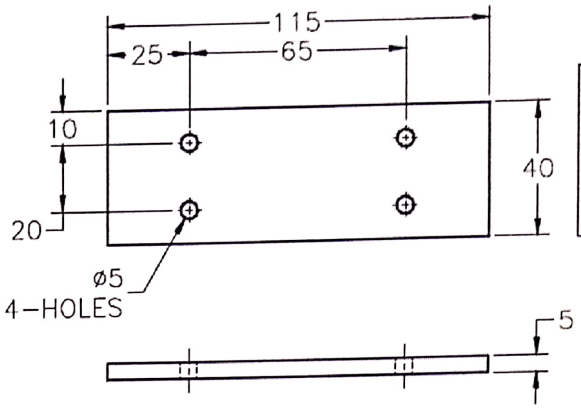


Figure Q2(ii): Dimensions of the base

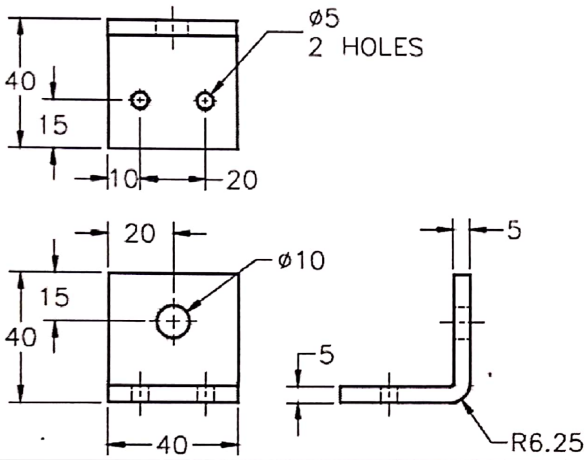


Figure Q2(iii): Dimensions of the support

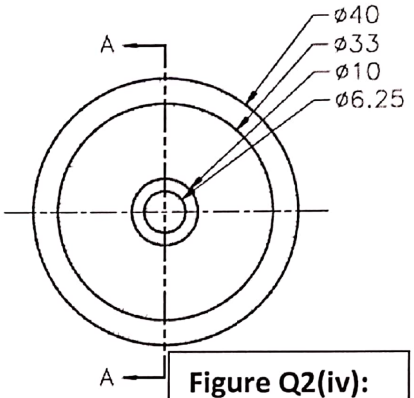


Figure Q2(iv): Front view of the wheel

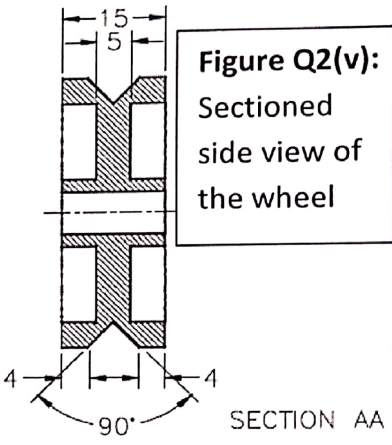
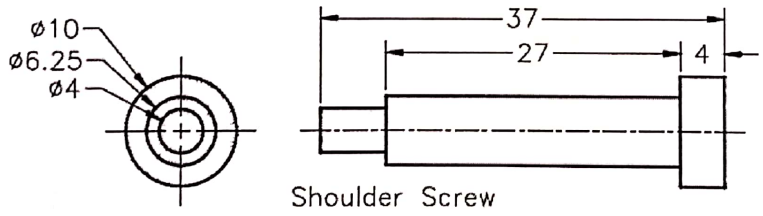


Figure Q2(v): Sectioned side view of the wheel



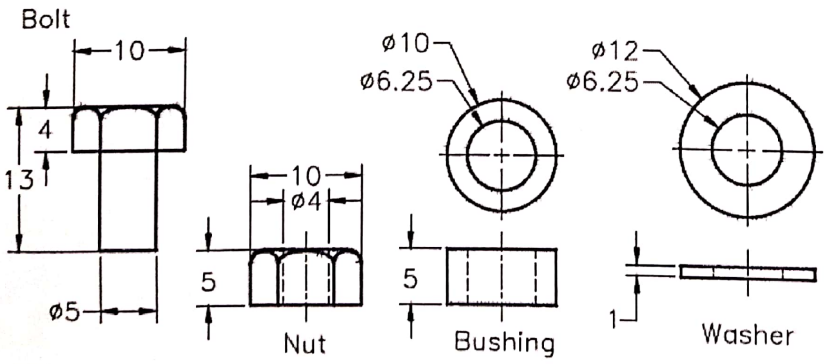


Figure Q2(vi): Dimensions of the Shoulder Screw; Bolt, Nut, Bushing and Washer

Question 3

a) (i) State and describe the three basic PTC Creo design modes

(ii) State the full meaning of the following Computer-Aided Technologies:

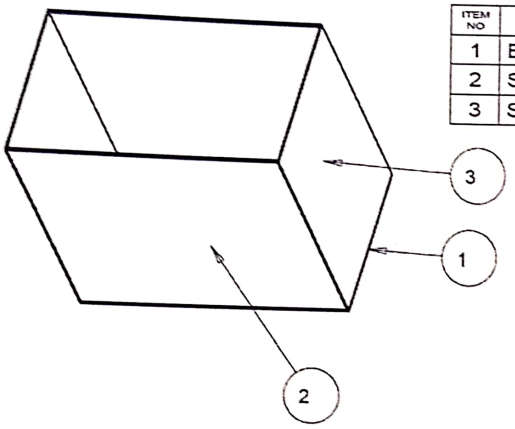
- CADD - CAQA - CAST - CIM - CAE

b) Explain the following terms in Pro/E

i) Constraints ii) Driving and Driven Dimensions iii) Pattern iv) Relation

v) Weak and Strong Dimensions

c) Without recourse to the actual dimensions of the component parts, ***briefly*** describe the steps you will follow to ***model*** and ***assemble*** the open box shown in Figure Q3 using PTC Creo



ITEM NO	PART NUMBER	QTY
1	BOTTOM-PLATE	1
2	SIDE-PLATE1	2
3	SIDE-PLATE2	2

Figure Q3: Model of an Open Box

Question 4

a) To properly utilize CAD, the engineer must have an in-depth knowledge of the Design process. Compare Shigley Model with Pahl and Beitz Model of design process.

b) PTC Creo Parametric is said to be a 'conglomerate' of many CAE units performing one engineering design/analysis or the other. State four of such units

c) Discuss the following terminologies in PTC Creo

i) Erase-Not-Displayed ii) File Iterations iii) Working Directory iv) File in Session

d) Without necessarily giving attention to the detailed dimensions provided, describe how you will model the bucket shown in Figure Q4 using Pro/E

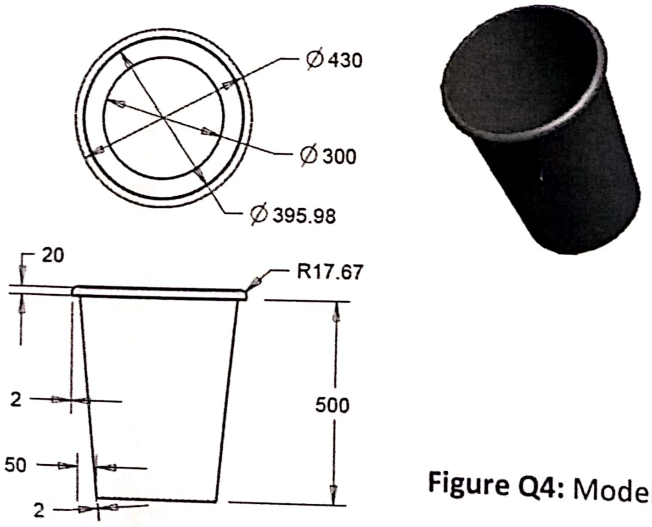


Figure Q4: Model of a Bucket

Question 5

a) (i) List three Parametric Design Software

(ii) Explain what it means for a design software to be parametric

b) List five (5) CAD/CAM activities sharing a common database

c) When in ***Assembly Mode*** of ProE, explain the following:

(i) No Constraint (ii) Packaged (iii) Use of *Default* constraint

d) The various design related tasks which are performed by the CAD system can be grouped into four functional areas. List them.

Question 6

a. Discuss ***Forward*** and ***Reverse*** Engineering

b. Differentiate between the different geometric modeling techniques depicted in Figure Q6b

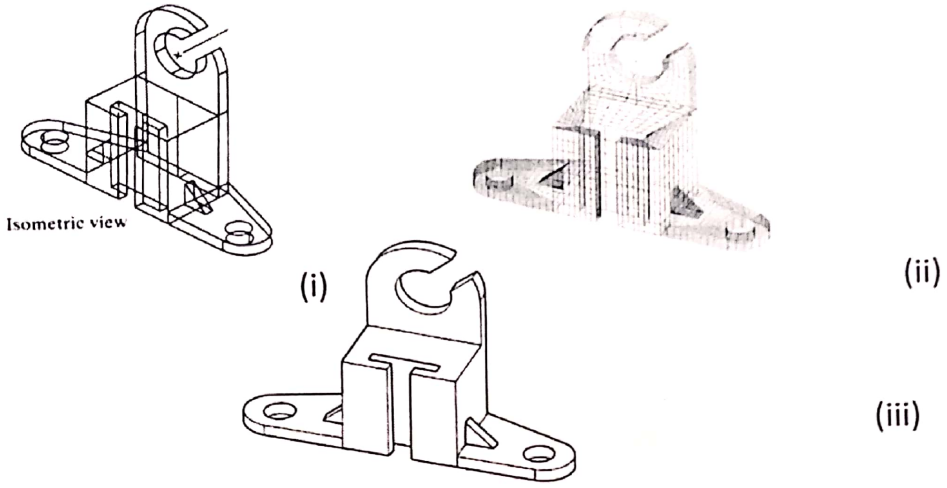


Figure Q6b: Geometric Modeling Techniques

c. i) Differentiate between First and Third Angle Projections

ii) Identify which Angle Projections were used to model Figures Q6c(ii-1) and c(ii-2). Sketch the symbol for each projection type

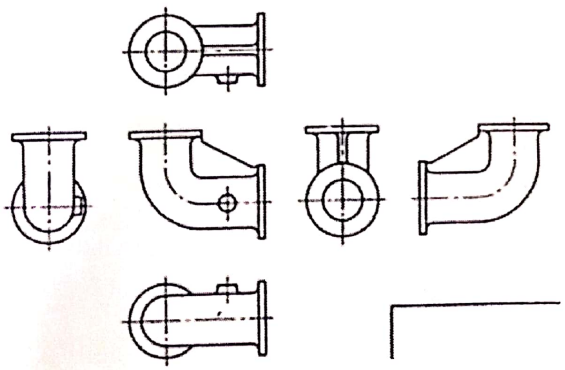


Figure Q6c(ii-1)

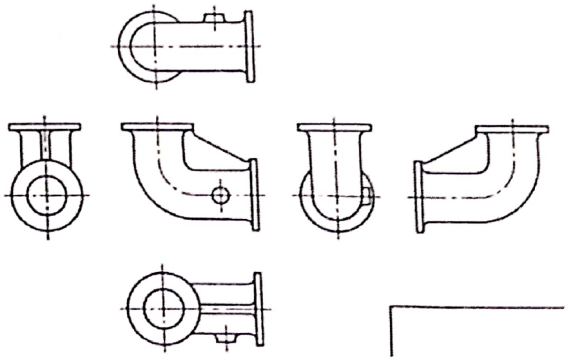


Figure Q6c(ii-2)

d. Write five benefits which a CAD system offers to the design engineer