

UNIVERSITY OF BOLTON
OFF CAMPUS DIVISION
WESTERN INTERNATIONAL COLLEGE
BENG(HONS) MECHANICAL ENGINEERING
TRIMESTER ONE EXAMINATION 2021/2022
GRAPHICAL COMMUNICATION & COMPUTER
MODELLING
MODULE NO: AME4065

Date: Thursday 13th January 2022

Time: 10:00 – 12:00

ASSESSMENT:

This assessment represents 40% of the total assessment mark for Graphical Communications & Computer Modelling.

INSTRUCTIONS TO CANDIDATES:

- Complete the following questions using a pencil for diagrams and pen for written answers. Write your student number, course and today's date above.
- The marks for each question are shown. The total number of marks available is 90. 10 marks of which are allocated for overall neatness, clarity and the use of standard lines.
- If you are unsure of what to do, ask your tutor. Separate the sheets if necessary but replace them in order at the end of the exam.
- BS EN 20286-2 Tolerance Tables are included in this exam paper.
- You have 2.0 hours to complete the test

1	2	3	4	5	6	7	8	9	Neat	Total
3	3	9	12	9	8	14	12	20	10	

Student Number:

Off Campus Division
Western International College
BEng(Hons) Mechanical Engineering
Trimester 1 Examination 2021/2022
Graphical Communications & Computer Modelling
Module No. AME4065

1. Write the full form of the following Standard Drawing abbreviation seen on engineering drawings:

- CBORE
○ MATL
○ NTS

(3 marks)

2. Write the standard abbreviation for the following when required on an engineering drawing:

- Revolution per minute
- Pitch Circle Diameter
- Specification

(3 marks)

3. Using the partially completed figures below, sketch the standard representation for the following features which might appear on an engineering drawing:

- **Diamond Knurl:**

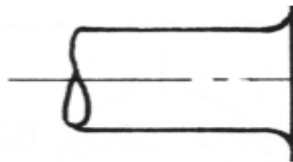


Figure 3 (a)

(3 marks)

- **cheese head:**

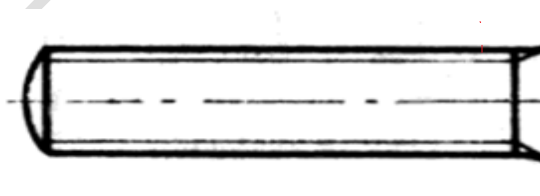


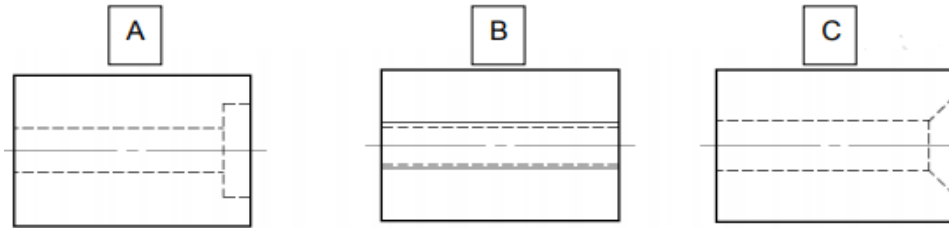
Figure 3 (b)

(3 marks)

Question 3 continues over the page...
PLEASE TURN THE PAGE.....

Off Campus Division
 Western International College
 BEng(Hons) Mechanical Engineering
 Trimester 1 Examination 2021/2022
 Graphical Communications & Computer Modelling
 Module No. AME4065
Question 3 continued...

- **A countersunk through hole (Tick the right answer)**



(3 marks)

Figure 3(c)

4. Drawn below in figure 4 is a cross-section through a Shaft, Bush Bearing and Housing arrangement. Select fits that allow and fill the data in Table Q4 below.
- The bush must remain in the Housing.
 - The shaft must easily slide and rotate in the bush.

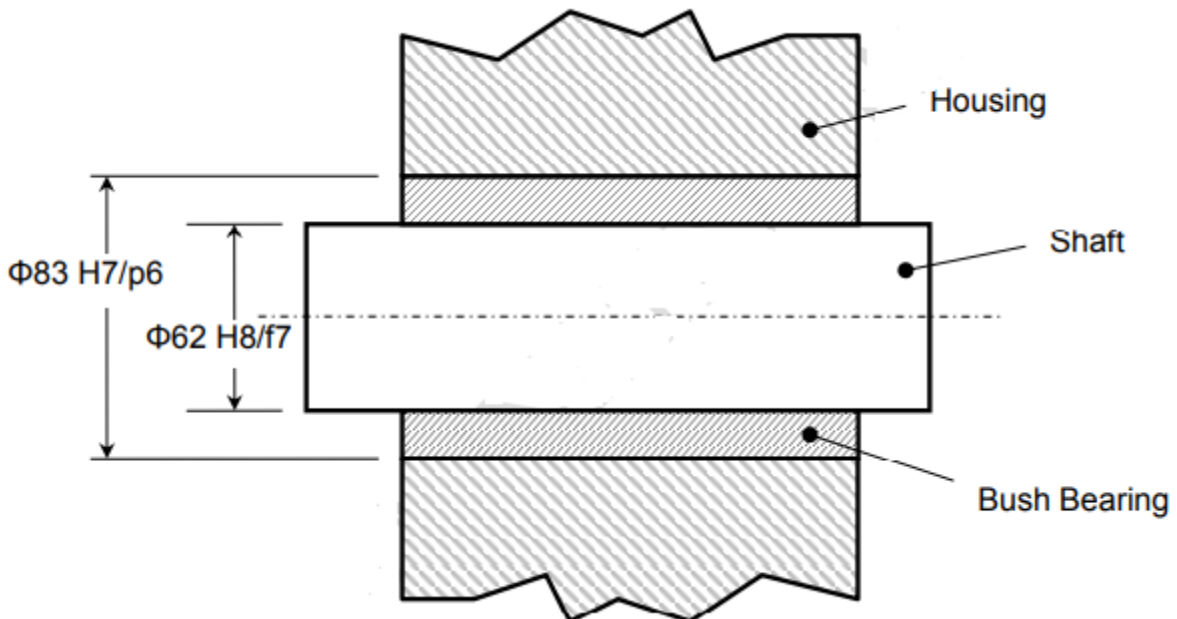


Figure 4

**Question 4 continues over the page...
 PLEASE TURN THE PAGE.....**

Off Campus Division
 Western International College
 BEng(Hons) Mechanical Engineering
 Trimester 1 Examination 2021/2022
 Graphical Communications & Computer Modelling
 Module No. AME4065
Question 4 continued...

Using BS EN 20286-2 Tolerance Tables (supplied), complete the following table:

Table Q4: Fits and Tolerance table.

Between Components	Grade of Tolerance	Type of Fit	Limits of Size for:	Size of Tolerance
Bush/Shaft	H8f7		Bush	
			Shaft	
Housing/Bush	H7 p6		Housing	
			Bush	

(12 marks)

PLEASE TURN THE PAGE.....

Off Campus Division
Western International College
BEng(Hons) Mechanical Engineering
Trimester 1 Examination 2021/2022
Graphical Communications & Computer Modelling
Module No. AME4065


5. State name and describe the meaning of the following Geometrical Tolerance symbols:

a. 

.....
(3 marks)

b. 

.....
(3 marks)

c. 

.....
(3 marks)

Total 9 marks

PAST EXAMINATION PAPER

PLEASE TURN THE PAGE.....

Off Campus Division
Western International College
BEng(Hons) Mechanical Engineering
Trimester 1 Examination 2021/2022
Graphical Communications & Computer Modelling
Module No. AME4065

6. Describe the geometric tolerances for the figure 6 below.

- I. What the symbols and dimensional information mean.
- II. The significance of the frame in the context of this component.

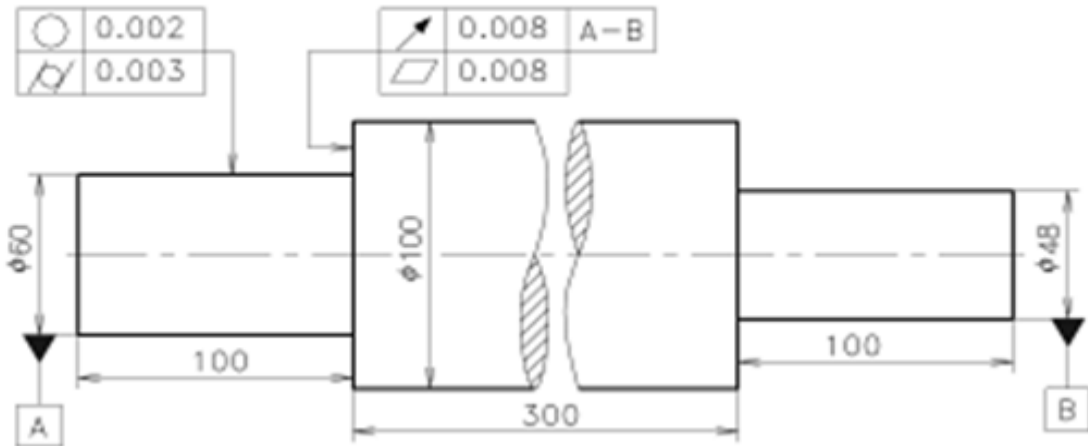


Figure 6: Shaft with bearing surface.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(8 marks)

PLEASE TURN THE PAGE.....

PAST EXAMINATIONS

Off Campus Division
 Western International College
 BEng(Hons) Mechanical Engineering
 Trimester 1 Examination 2021/2022
 Graphical Communications & Computer Modelling
 Module No. AME4065

7. An isometric drawing of a tool post is given below in **Figure 7**. The drawing is not to the scale. Use front view (F.V.) shown below with an arrow for drawing reference.

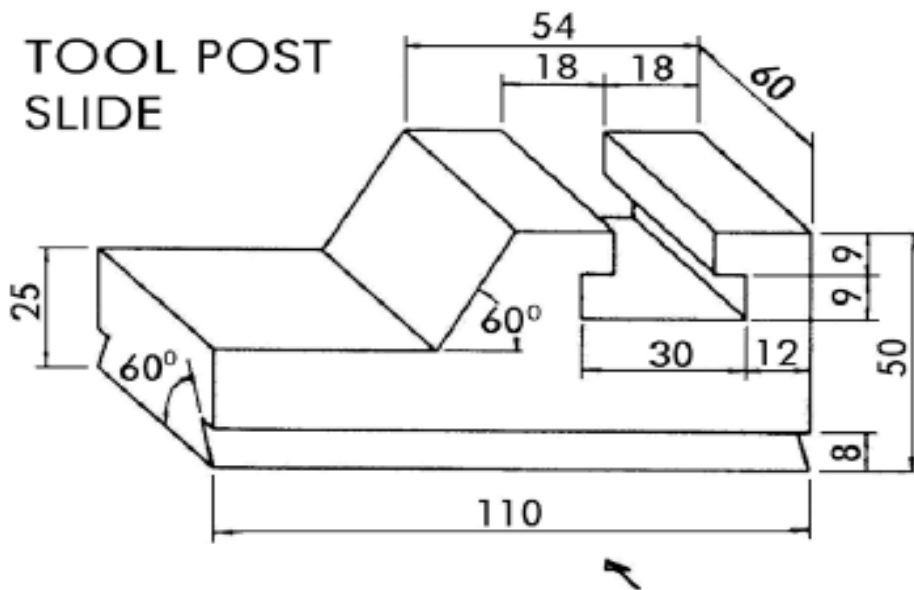


Figure 7: Tool Post.

Sketch in 1st Angle Projection, the Elevation and Plan view of the given drawing in SHEET Q7 with proper projection symbol and student number in title block.

- a) Elevation View

(8 marks)

- b) Plan View

(4 marks)

- c) Student number and Projection symbol

(2 marks)

Total 14 marks

PLEASE TURN THE PAGE.....

Off Campus Division
Western International College
BEng(Hons) Mechanical Engineering
Trimester 1 Examination 2021/2022
Graphical Communications & Computer Modelling
Module No. AME4065

8. SHEET Q8 shows a partially completed Orthographic drawing section of a Lever. The Plan View is already drawn and the Section View is missing. The cutting plane passes longitudinally through the centre of the web and section plane is given in the Top view of the lever as A-A.

The overall dimensions shown are in mm with section line as A-A. Supply all sectioning information as necessary. Put your student number in the title block.

Sketch using 3rd Angle method of projection the following

- a) Dimensioned Front View (6 marks)
- b) Sectioning with the section line A-A (4 marks)
- c) Student number and Projection symbol (2 marks)

Total 12 marks

9. Shown below is the 'Universal Coupling Parts' drawing on page 9, the components that make up a Universal Coupling Assembly. Each part is dimensioned appropriately with two views for reference. (the drawing are in mm):

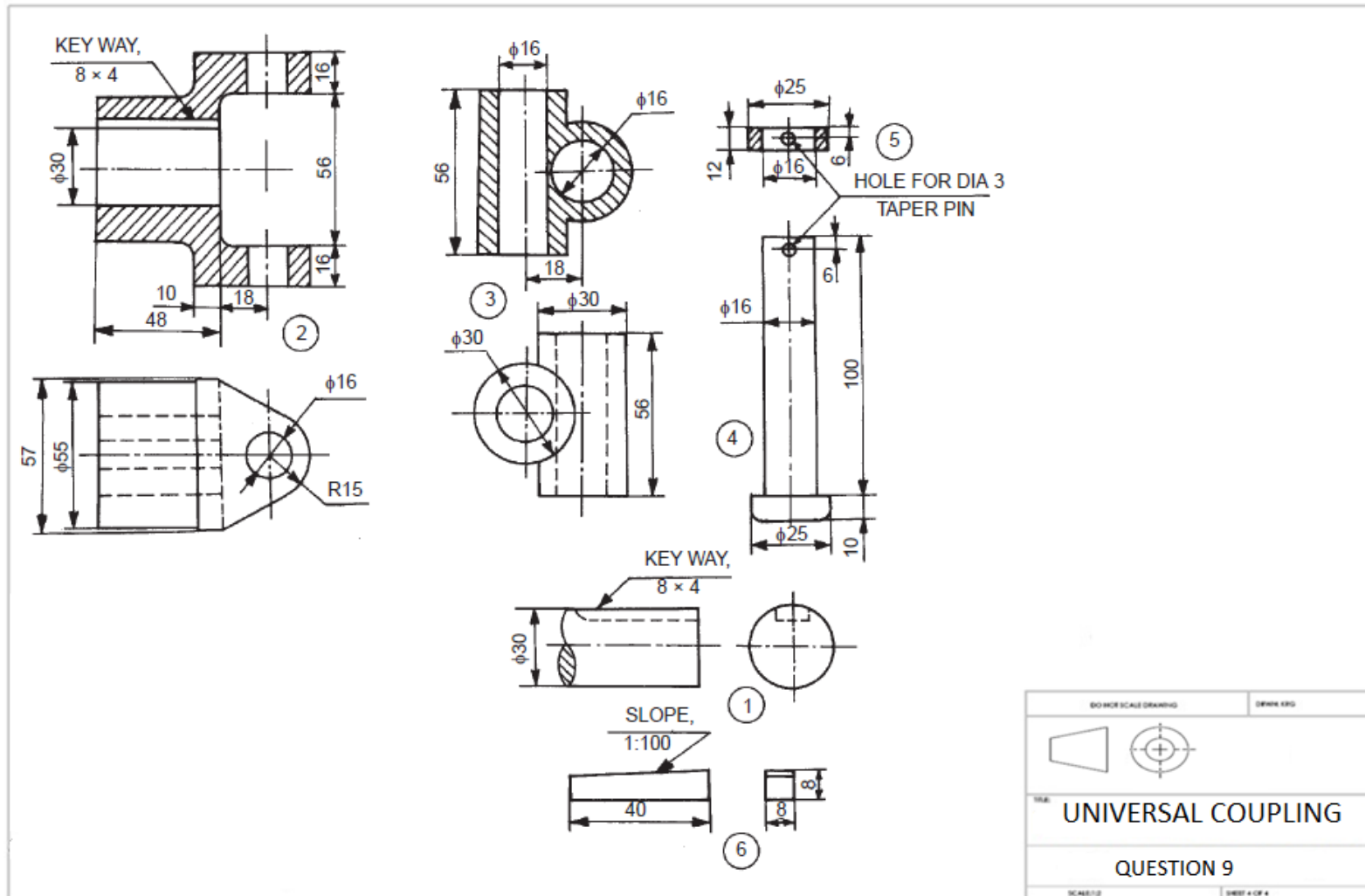
Use a pencil and setsquares; draw an **assembly drawing** in SHEET Q9. Show all the parts assembled in their correct positions and hatched according to drawing conventions.

- a) Complete Front View in good proportion (10 marks)
- b) Sectioning of the assembly drawing (4 marks)
- c) Balloon reference the assembly (2 marks),
- d) Create Part list of the assembly (4 marks)

Total: 20 Marks

END OF QUESTIONS
PLEASE TURN PAGE FOR FORMULAS AND TOLERANCE TABLES.....

Off Campus Division
 Western International College
 BEng(Hons) Mechanical Engineering
 Trimester 1 Examination 2021/2022
 Graphical Communications & Computer Modelling
 Module No. AME4065



PLEASE TURN THE PAGE.....

Off Campus Division
Western International College
BEng(Hons) Mechanical Engineering
Trimester 1 Examination 2021/2022
Graphical Communications & Computer Modelling
Module No. AME4065
SHEET Q7

PROJECTION	STU NO.
	TITLE: QUESTION 7
	<small>SHEET 3 OF 4</small>

PLEASE TURN THE PAGE.....

Off Campus Division
Western International College
BEng(Hons) Mechanical Engineering
Trimester 1 Examination 2021/2022
Graphical Communications & Computer Modelling
Module No. AME4065
SHEET Q8

Plan


Isometric view

PROJECTION	STU NO.
	TITLE: QUESTION 8
	<small>SHEET 3 OF 4</small>

PLEASE TURN THE PAGE.....

Off Campus Division
Western International College
BEng(Hons) Mechanical Engineering
Trimester 1 Examination 2021/2022
Graphical Communications & Computer Modelling
Module No. AME4065
SHEET Q9

PR

ISO FIRST ANGLE DRAWING		DRWING KING
	STUDENT NO:	
TITLE UNIVERSAL COUPLING		
QUESTION 9 ANSWER SHEET		
SCALE 1:2	SHEET 4 OF 4	

PA

PLEASE TURN THE PAGE.....

Off Campus Division
 Western International College
 BEng(Hons) Mechanical Engineering
 Trimester 1 Examination 2021/2022
 Graphical Communications & Computer Modelling
 Module No. AME4065

e13	-20 - 200	-25 - 245	-32 - 302	-40 - 370	-50 -440	-60 -520	-72 -612	-85 -715	-100 -820	-110 -920	-125 -1015
f5	-10 -15	-13 -19	-16 -24	-20 -29	-25 -36	-30 -43	-36 -51	-43 -61	-50 -70	-56 -79	-62 -87
f6	-10 -18	-13 -22	-16 -27	-20 -33	-25 -41	-30 -49	-36 -58	-43 -68	-50 -79	-56 -88	-62 -98
f7	-10 -22	-13 -28	-16 -34	-20 -41	-25 -50	-30 -60	-36 -71	-43 -83	-50 -96	-56 -108	-62 -119
g5	-4 -9	-5 -11	-6 -14	-7 -16	-9 -20	-10 -23	-12 -27	-14 -32	-15 -35	-17 -40	-18 -43
g6	-4 -12	-5 -14	-6 -17	-7 -20	-9 -25	-10 -29	-12 -34	-14 -39	-15 -44	-17 -49	-18 -54
g7	-4 -16	-5 -20	-6 -24	-7 -28	-9 -34	-10 -40	-12 -47	-14 -54	-15 -61	-17 -69	-18 -75
h4	-0 -4	-0 -4	-0 -5	-0 -6	-0 -7	-0 -8	-0 -10	-0 -12	-0 -14	-0 -16	-0 -18
h5	-0 -5	-0 -6	-0 -8	-0 -9	-0 -11	-0 -13	-0 -15	-0 -18	-0 -20	-0 -23	-0 -25
h6	-0 -8	-0 -9	-0 -11	-0 -13	-0 -16	-0 -19	-0 -22	-0 -25	-0 -29	-0 -32	-0 -36
h7	-0 -12	-0 -15	-0 -18	-0 -21	-0 -25	-0 -30	-0 -35	-0 -40	-0 -46	-0 -52	-0 -57
h8	-0 -18	-0 -22	-0 -27	-0 -33	-0 -39	-0 -46	-0 -54	-0 -63	-0 -72	-0 -81	-0 -89
h9	-0 -30	-0 -36	-0 -43	-0 -52	-0 -62	-0 -74	-0 -87	-0 -100	-0 -115	-0 -130	-0 -140
h10	-0 -48	-0 -58	-0 -70	-0 -84	-0 -100	-0 -120	-0 -140	-0 -160	-0 -185	-0 -210	-0 -230
h11	-0 -75	-0 -90	-0 -110	-0 -130	-0 -160	-0 -190	-0 -220	-0 -250	-0 -290	-0 -320	-0 -360
h12	-0 -120	-0 -150	-0 -180	-0 -210	-0 -250	-0 -300	-0 -350	-0 -400	-0 -460	-0 -520	-0 -570
j5	+3 -2	+4 -2	+5 -3	+5 -4	+6 -5	+6 -7	+6 -9	+7 -11	+7 -13	+7 -16	+7 -18
j6	+6 -2	+7 -2	+8 -3	+9 -4	+11 -5	+12 -7	+13 -9	+14 -11	+16 -13	+16 -16	+18 -18
j7	+8 -4	+10 -5	+12 -6	+13 -8	+15 -10	+18 -12	+20 -15	+22 -18	+25 -21	+26 -26	+29 -28
js5	+2.5 -2.5	+3 -3	+4 -4	+4.5 -4.5	+5.5 -5.5	+6.5 -6.5	+7.5 -7.5	+9 -9	+10 -10	+11.5 -11.5	+12.5 -12.5
js6	+4 -4	+4.5 -4.5	+5.5 -5.5	+6.5 -6.5	+8 -8	+9.5 -9.5	+11 -11	+12.5 -12.5	+14.5 -14.5	+16 -16	+18 -18
js7	+6 -6	+7.5 -7.5	+9 -9	+10.5 -10.5	+12.5 -12.5	+15 -15	+17.5 -17.5	+20 -20	+23 -23	+26 -26	+28.5 -28.5
k5	+6 +1	+7 +1	+9 +1	+11 +2	+13 +2	+15 +2	+18 +3	+21 +3	+24 +4	+27 +4	+29 +4
k6	+9 +1	+10 +1	+12 +1	+15 +2	+18 +2	+21 +2	+25 +3	+28 +3	+33 +4	+36 +4	+40 +4
k7	+13 +1	+16 +1	+19 +1	+23 +2	+27 +2	+32 +2	+38 +3	+43 +3	+50 +4	+56 +4	+61 +4
m5	+9 +4	+12 +6	+15 +7	+17 +8	+20 +9	+24 +11	+28 +13	+33 +15	+37 +17	+43 +20	+46 +21
m6	+12 +4	+15 +6	+18 +7	+21 +8	+25 +9	+30 +11	+35 +13	+40 +15	+46 +17	+52 +20	+57 +21
m7	+16 +4	+21 +6	+25 +7	+29 +8	+34 +9	+41 +11	+48 +13	+55 +15	+63 +17	+72 +20	+78 +21

Off Campus Division
 Western International College
 BEng(Hons) Mechanical Engineering
 Trimester 1 Examination 2021/2022
 Graphical Communications & Computer Modelling
 Module No. AME4065

n5	+13 +8	+16 +10	+20 +12	+24 +15	+28 +17	+33 +20	+38 +23	+45 +27	+51 +31	+57 +34	+62 +37								
n6	+16 +8	+19 +10	+23 +12	+28 +15	+33 +17	+39 +20	+45 +23	+52 +27	+60 +31	+66 +34	+73 +37								
n7	+20 +8	+25 +10	+30 +12	+36 +15	+42 +17	+50 +20	+58 +23	+67 +27	+77 +31	+86 +34	+94 +37								
p5	+17 +12	+21 +15	+26 +18	+31 +22	+37 +26	+45 +32	+52 +37	+61 +43	+70 +50	+79 +56	+87 +62								
p6	+20 +12	+24 +15	+29 +18	+35 +22	+42 +26	+51 +32	+59 +37	+68 +43	+79 +50	+88 +56	+98 +62								
r6	+23 +15	+28 +19	+34 +23	+41 +28	+50 +34	+60 +41	+62 +43	+73 +51	+76 +54	+88 +63	+90 +65	+93 +68	+106 +77	+109 +80	+113 +84	+126 +94	+130 +98	+144 +108	+150 +114

END OF FORMULA SHEETS AND TABLES

END OF PAPER