TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL & AUTOMOTIVE ENGINEERING

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN MECHANICAL ENGINEERING

EME 2108: ENGINEERING DRAWING II

SUPPLEMENTARY/SPECIAL EXAMINATIONS

SERIES: Select series2016

TIME: 2HOURS

DATE: Pick DateSelect MonthPick Year

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, drawing instruments, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE(COMPULSORY)

Figure Q.1 shows details parts of a Vee block clamp. Draw to full scale in the first angle orthographic projection the following views

i. Front elevation of correctly assembled block clamp
ii. Sectional end elevation along plane A-A
iii. Prepare a part list ***(20mks)***

Question TWO

A cam is to be designed for a knife-edge follower with the following data:

Cam lift = 40mm during 90^O of cam rotation with simple harmonic motion.

Dwell for the next 30^O.

During the next 60^O of the cam rotation, the follower returns to its original position with a simple harmonic motion.

Dwell during the remaining 180^O.

Draw the profile of the cam when the line of stroke is offset 20mm from the axis of the cam shaft. ***(20mks)***

Question THREE

a) With the aid of neat sketches, define the following screw thread terminologies**.**

i. Crest
ii. Major diameter
iii. Pitch
iv. Effective diameter ***(8mks)***

b) Construct the profile for a single –start right –hand square thread with major diameter 100mm and lead 36mm, scale 1:1 ***(12mks)***

Question FOUR

Figure Q.4 shows a slider-crank mechanism. The crank OA rotates about a fixed centre O. The connecting rod AP slides in a trunnion, which pivots about point X. if OA = 35mm, AP = 130mm and OX = 85mm, construct the locus of point P.. ***(20mks)***

Question FIVE

a) Illustrate with diagrams the following types of fits:

i. clearance fit
ii. transition fit
iii. interference fit***(6mks)***

b) Define the maximum and minimum limits of size, for the hole and shaft, in the following rating systems:

i. 55mm H8/f6
ii. 225mm H7/p7
iii. 7.5mm H7/k6

Which kind of fit is achieved in each instance?***(6mks)***

c) Figure Q.5 shows a sectional bush shaft assembly. Use BS4500 selected ISO fits table to find the limits and fits between:

i. bush and housing
ii. bush and shaft***(8mks)***

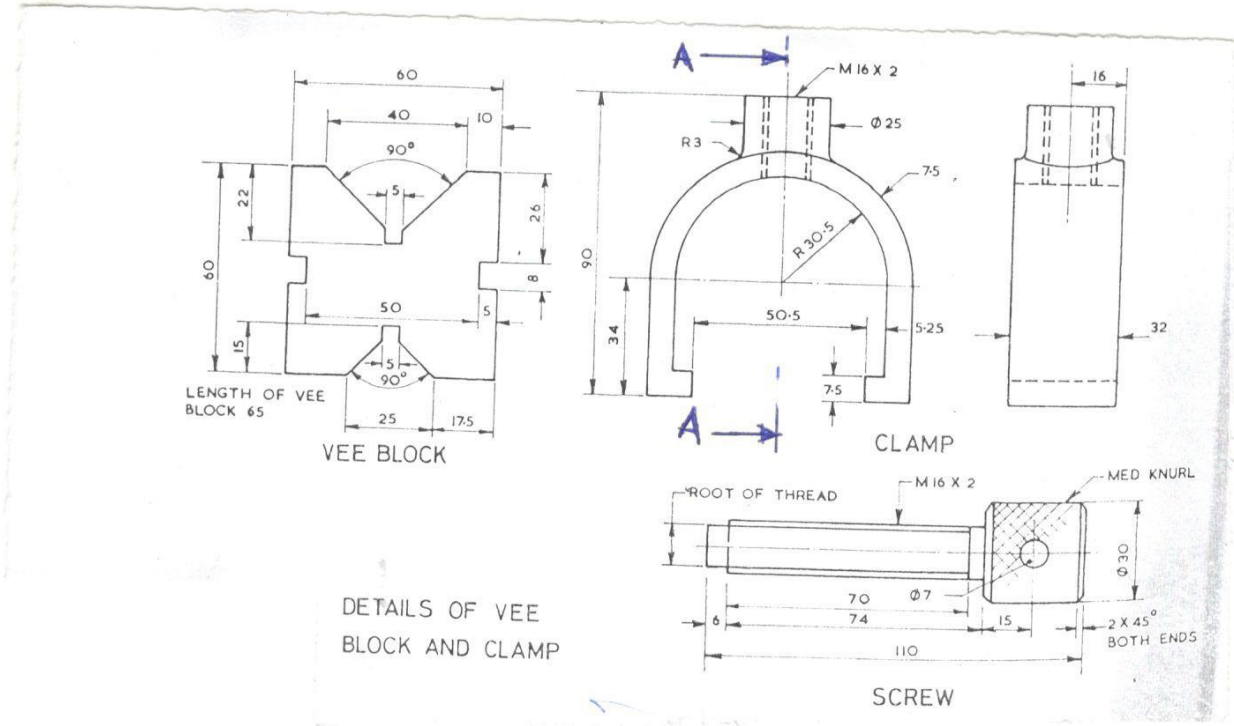

60
40
10
90°
22
5
26
60
8
50
5
15
5
90°
LENGTH OF VEE BLOCK 65
25
17.5
VEE BLOCK
A
M 16 X 2
Ø 25
R 3
7·5
R 30·5
90
34
50·5
5·25
7·5
A
CLAMP
16
32
ROOT OF THREAD
M 16 X 2
MED KNURL
Ø 30
70
Ø 7
6
74
15
2 X 45°
BOTH ENDS
110
SCREW
DETAILS OF VEE
BLOCK AND CLAMP

FIGURE Q.1

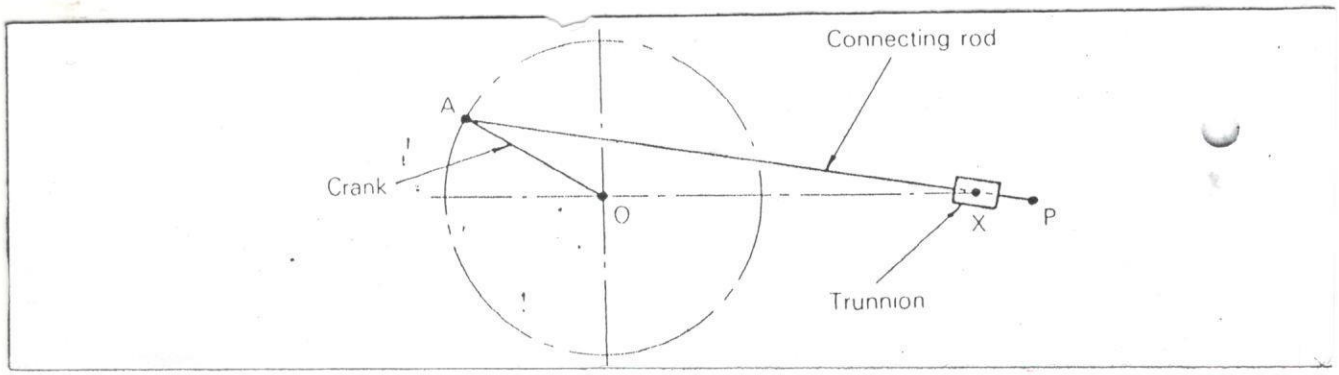


FIGURE Q.4

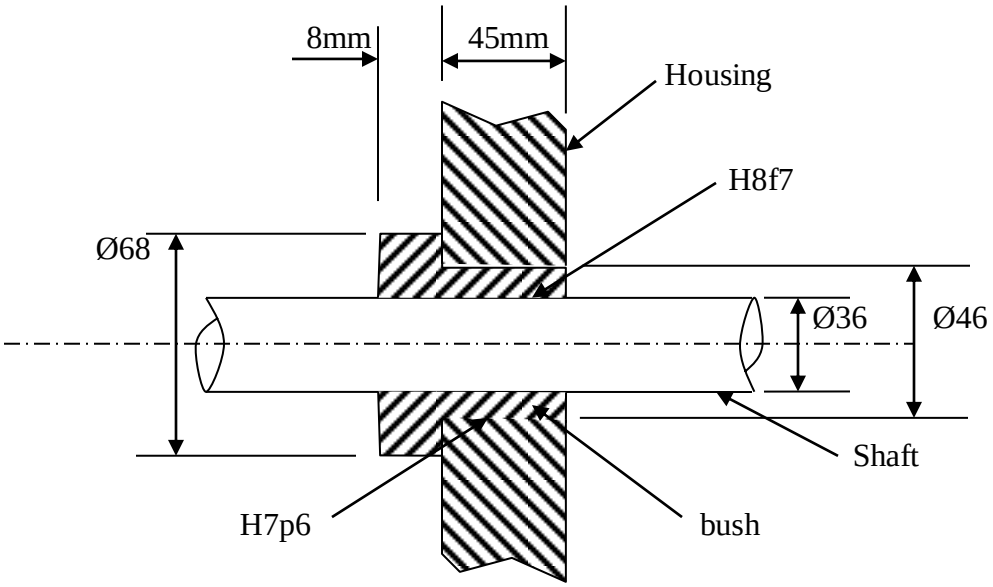


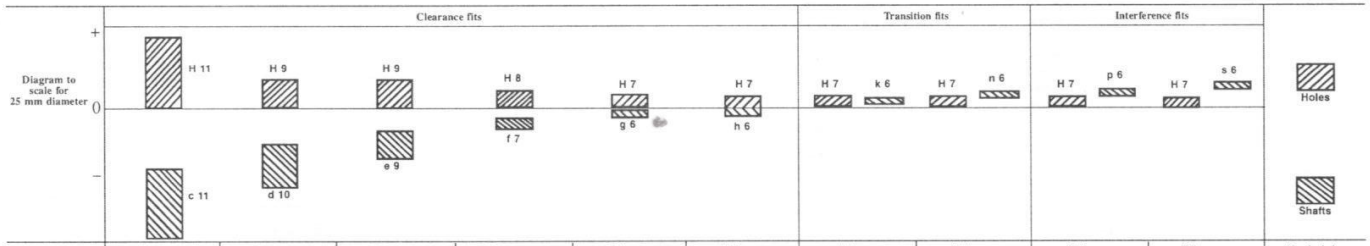
FIGURE Q.5

Extracted from BS 4500 : 1969

BRITISH STANDARD

SELECTED ISO FITS—HOLE BASIS

Data Sheet
4500A
Issue 1. February 1970
confirmed August 1985



Nominal sizes		Tolerance		Tolerance		Tolerance		Tolerance		Tolerance		Tolerance		Tolerance		Tolerance		Tolerance		Tolerance		Nominal sizes	
Over	To	H11	c11	H9	d10	H9	e9	H8	f7	H7	g6	H7	h6	H7	k6	H7	n6	H7	p6	H7	s6	Over	To
mm	mm	0.001 mm	0.001 mm	0.001 mm	0.001 mm	0.001 mm	0.001 mm	0.001 mm	0.001 mm	0.001 mm	0.001 mm	0.001 mm	0.001 mm	0.001 mm	0.001 mm	0.001 mm	0.001 mm	0.001 mm	0.001 mm	0.001 mm	0.001 mm	mm	mm
—	3	+ 60 0	− 60 − 120	+ 25 0	− 20 − 60	+ 25 0	− 14 − 39	+ 14 0	− 6 − 16	+ 10 0	− 2 − 8	+ 10 0	− 6 0	+ 10 0	+ 6 + 0	+ 10 0	+ 10 + 4	+ 10 0	+ 12 + 6	+ 10 0	+ 20 + 14	—	3
3	6	+ 75 0	− 70 − 145	+ 30 0	− 30 − 78	+ 30 0	− 20 − 50	+ 18 0	− 10 − 28	+ 12 0	− 4 − 12	+ 12 0	− 8 0	+ 12 0	+ 9 + 1	+ 12 0	+ 16 + 8	+ 12 0	+ 20 + 12	+ 12 0	+ 27 + 19	3	6
6	10	+ 90 0	− 80 − 170	+ 36 0	− 40 − 98	+ 36 0	− 25 − 61	+ 22 0	− 13 − 28	+ 15 0	− 5 − 14	+ 15 0	− 9 0	+ 15 0	+ 10 + 1	+ 15 0	+ 19 + 10	+ 15 0	+ 24 + 15	+ 15 0	+ 32 + 23	6	10
10	18	+ 110 0	− 95 − 205	+ 43 0	− 50 − 120	+ 43 0	− 32 − 75	+ 27 0	− 16 − 34	+ 18 0	− 6 − 17	+ 18 0	− 11 0	+ 18 0	+ 12 + 1	+ 18 0	+ 23 + 12	+ 18 0	+ 29 + 18	+ 18 0	+ 39 + 28	10	18
18	30	+ 130 0	− 110 − 240	+ 52 0	− 65 − 149	+ 52 0	− 40 − 92	+ 33 0	− 20 − 41	+ 21 0	− 7 − 20	+ 21 0	− 13 0	+ 21 0	+ 15 + 2	+ 21 0	+ 28 + 15	+ 21 0	+ 35 + 22	+ 21 0	+ 48 + 35	18	30
30	40	+ 160 0	− 120 − 280	+ 62	− 80	+ 62	− 50	+ 39	− 25	+ 25	− 9	+ 25	− 16	+ 25	+ 18	+ 25	+ 33	+ 25	+ 42	+ 25	+ 59	30	40
40	50	+ 160 0	− 130 − 290	0	− 180	0	− 112	0	− 50	0	− 25	0	0	0	+ 2	0	+ 17	0	+ 26	0	+ 43	40	50
50	65	+ 190 0	− 140 − 330	+ 74	− 100	− 74	− 60	+ 46	− 30	+ 30	− 10	+ 30	− 19	+ 30	+ 21	+ 30	+ 39	+ 30	+ 51	+ 30 0	+ 72 + 53	50	65
65	80	+ 190 0	− 150 − 340	0	− 220	0	− 134	0	− 60	0	− 29	0	0	0	+ 2	0	+ 20	0	+ 32	+ 30 0	+ 78 + 59	65	80
80	100	+ 220 0	− 170 − 390	+ 87	− 120	− 87	− 72	+ 54	− 36	+ 35	− 12	+ 35	− 22	+ 35	+ 25	+ 35	+ 45	+ 35	+ 59	+ 35 0	+ 93 + 71	80	100
100	120	+ 220 0	− 180 − 400	+ 0	− 260	− 0	− 159	0	− 71	0	− 34	0	0	0	+ 3	0	+ 23	0	+ 37	+ 35 + 0	+ 101 + 79	100	120
120	140	+ 250 0	− 200 − 450	+ 100	145	+ 100	− 84	+ 63	− 43	− 40	− 14	+ 40	− 25	+ 40	+ 28	+ 40	+ 52	− 40	+ 68	+ 40 0	+ 117 + 92	120	140
140	160	+ 250 0	− 210 − 460	0	305	0	− 185	0	− 83	0	− 39	0	0	0	+ 3	0	+ 27	0	+ 43	+ 40 0	+ 125 + 100	140	160
160	180	+ 250 0	− 230 − 480																	+ 40 0	+ 133 + 108	160	180
180	200	+ 290 0	− 240 530	+ 115	− 170	+ 115	− 100	+ 72	− 50	+ 46	− 15	+ 46	− 29	+ 46	+ 33	+ 46	+ 60	+ 46	+ 79	+ 46 0	+ 151 + 122	180	200
200	225	+ 290 0	260 550	0	− 355	0	− 215	0	− 96	0	− 44	0	0	0	+ 4	0	+ 31	0	+ 50	+ 46 0	+ 159 + 130	200	225
225	250	+ 290 0	280 570																	+ 46 0	+ 169 + 140	225	250
250	280	+ 320 0	300 620	+ 130	− 190	+ 130	− 110	+ 81	− 56	+ 52	− 17	+ 52	− 32	+ 52	− 36	+ 52	+ 66	+ 52	+ 88	+ 52 0	+ 190 + 158	250	280
280	315	+ 320 0	330 650	0	− 400	0	− 240	0	− 108	0	− 49	0	0	0	+ 4	0	+ 34	0	+ 56	+ 52 0	+ 202 + 170	280	315
315	355	+ 360 0	360 − 720	+ 140	− 210	+ 140	− 125	+ 89	− 62	+ 57	− 18	+ 57	− 36	+ 57	+ 40	+ 57	+ 73	+ 57	+ 98	+ 57 0	+ 226 + 190	315	355
355	400	+ 360 0	400 760	0	− 440	0	− 265	0	− 119	0	− 54	0	0	0	+ 4	0	+ 37	0	+ 62	+57 0	+ 244 + 208	355	400
400	450	+ 400 0	440 840	+ 155	− 230	+ 155	− 135	+ 97	− 68	+ 63	− 20	+ 63	− 40	+ 63	+ 45	+ 63	+ 80	+ 63	+ 108	+ 63 0	+ 272 + 232	400	450
450	500	+ 400 0	480 880	0	− 480	0	− 290	0	− 131	0	− 60	0	0	0	+ 5	0	+ 40	0	+ 68	+ 63 0	+ 292 + 252	450	500

BRITISH STANDARDS INSTITUTION, 2 Park Street, London, W1A 2BS
SBN: 580 05766 6