KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2010/2011

FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER ENGINEERING

SCE 116: ENGINEERING DRAWINGS AND DESIGN II

DATE: FRIDAY 26TH NOVEMBER 2010 **TIME: 11.00 A.M. - 1.00 P.M.**

INSTRUCTIONS

(i) This paper contains **FIVE (5)** questions.

(ii) You are required to answer **THREE (3)** questions only.

(iii) Question **one** is compulsory.

(iv) Attempt any other two questions.

(v) Question one carries 30 marks and the others carry 20 marks each.

(vi) Construction lines should be faint and should not be erased.

(vii) All dimensions are in millimeters unless otherwise stated.

(viii) Missing and mismatching dimensions, if any, may be suitably assumed.

Question 1

The designer's detail layout sketch of a jig used for inspecting shafts is shown in fig. Q1, ready for a general- assembly to be drawn. The jig is to be assembled with a 150 mm length of 20 mm diameter shaft clamped between the jaw and the vee groove in the base. The shaft is to be shown protruding 10 mm beyond the right of the base. Draw to a suitable scale in 3rd angle projection:

(a)	The sectional front view on the vertical cutting plane A-A.	(8 marks)
(b)	The plan view projected from the front elevation.	(6 marks)
(c)	The end view.	(6 marks)
(d)	The parts list	(4 marks)
(e)	A suitable title block	(4 marks)
(f)	ISO symbol	(2 marks)

Note :
No dimensions are required in your drawing.

Question 2

(a) Draw symbols of the following electrical and electronic items according to BS 5070 and BS 3939:

(i)	Conductors crossing with no electrical contact	(1 mark)
(ii)	Junction of two conductors	(1 mark)
(iii)	Plug	(1 mark)
(iv)	Socket for plug	(1 mark)
(v)	Fuse	(1 mark)
(vi)	Variable resistor	(1 mark)

(b) Draw a simple circuit diagram of battery, filament lamp and switch. The 3- volt battery will light the 3-volt filament lamp when the switch is made.(4 marks)

(c) Draw a circuit diagram representing a four- cell battery connected to a bell via a switch. When the switch is made, the bell will ring. There should be a capacitor that causes sharper current impulses across the bell winding. (5 marks)

(d) Draw a simple parallel circuit diagram representing 12- volt battery to light three 12 – volt bulbs when the switch is made. (5 marks)

Question 3

(a) A piece of string equal to the circumference of a cylinder, diameter 42 mm, is attached to a point on the circumference of the cylinder.

(i) Draw the path of the free end of the string as it is wound round the cylinder in a plane perpendicular to the axis of the cylinder.

(ii) Draw a normal and a tangent at any point of the curve.

(iii) Name and state one application of the curve produced.

(13 marks)

(b) Fig. Q3 (b) shows 2 views (i.e Front and Plan) of part of a regular prism. Side of base 20 mm is truncated at top and cut away from below as shown. Develop the lateral surface of the remaining prism. (7 marks)

Question 4

(a) Draw a diagram to illustrate each of the following:

(i) Clearance fit. (2 marks)

(ii) Transition fit. (2 marks)

(iii) Interference fit. (2 marks)

(b) Fig. Q4. Shows a sectional assembly of a boss, a bush and a shaft. Normal fit exists between the shaft and bush while press fit exists between the bush and the boss.

(i) Using Data sheet 4500A (Selected ISO Fits – Hole Basis) extracted from BS 4500 provided, calculate the working limits of shaft diameter, bush hole diameter, bush outer diameter and boss hole diameter [AB]. (8 marks)

(ii) Draw the shaft, the bush and the boss illustrating how these limits are dimensioned. (6 marks).

Note :
Draw each part separately.

Question 5

(a) Draw conventional representation of the following components:

(i) A sectional view of Nut and bolt assembly with a washer. (9 marks)
(ii) A sectional view of Set bolt assembly.
(iii) A sectional view of Nut and stud assembly.

(b) In a neat diagram show how the following machining symbols are shown:
(i) Roughness value- a
(ii) Method of treatment – b
(iii) Sampling length – c
(iv) Direction of lay – d (2 marks)

(c) In single line piping diagrams how are the following represented:
(i) Gate valve
(ii) Tee
(iii) Lateral
(iv) Flanged joint
(v) Screwed joint
(vi) Soldered joint (9 marks)

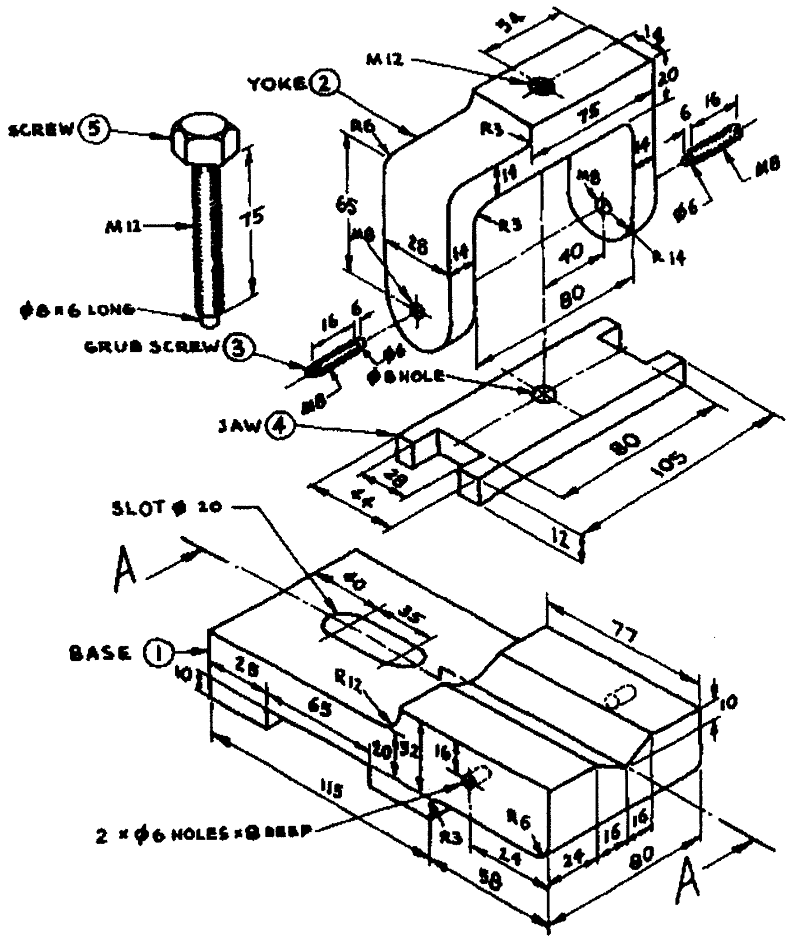

SCREW (5)
YOKE (2)
GRUB SCREW (3)
JAW (4)
BASE (1)
M12
ϕ8 × 6 LONG
ϕ8 HOLE
SLOT ϕ 20
A
A

Fig. Q1

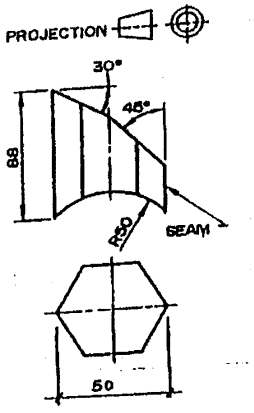


Fig. Q3(b)

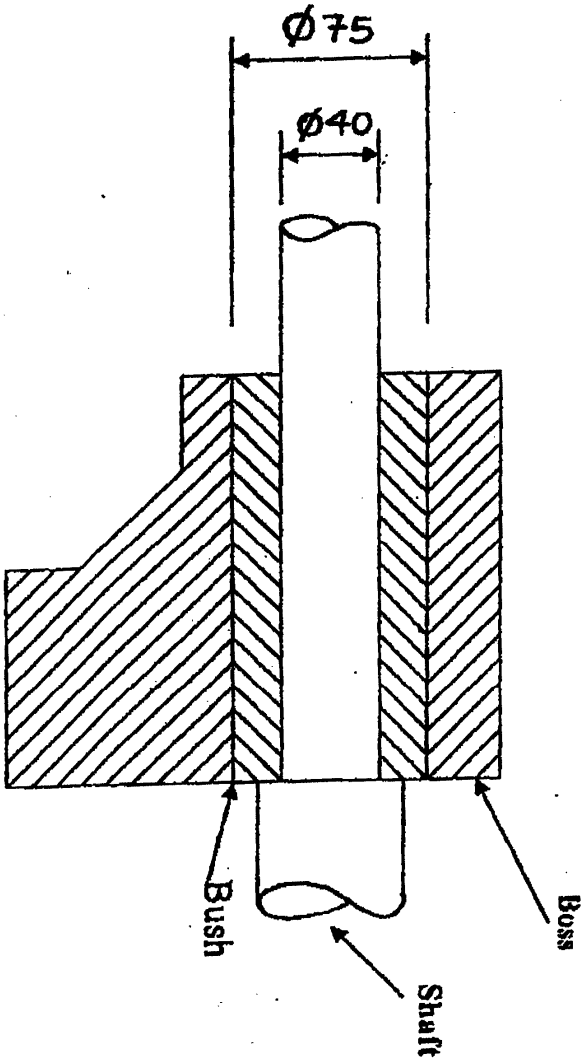


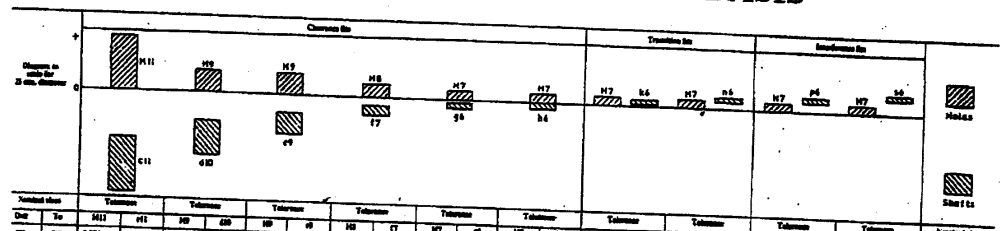
Fig. Q4

Extracted from BS 4500:

BRITISH STANDARD

SELECTED ISO FITS—HOLE BASIS

Data Sheet 4500A



Nominal sizes		Clearance fits										Transition fits				Interference fits				Nominal sizes	
Over	To	Tolerances		Tolerances		Tolerances		Tolerances		Tolerances		Tolerances		Tolerances		Tolerances		Tolerances			
		H11	c11	H9	d10	H9	e9	H8	f7	H7	g6	H7	k6	H7	n6	H7	p6	H7	s6		
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	mm	mm
—	3	+60 0	−120 −180	+25 0	−60 −100	+25 0	−14 −39	+14 0	−6 −16	+10 0	−2 −8	+10 0	−6 −10	+10 0	−10 −14	+10 0	+12 +6	+14 0	+24 +18	—	3
3	6	+75 0	−145 −220	+30 0	−78 −118	+30 0	−20 −50	+18 0	−10 −22	+12 0	−4 −12	+12 0	−1 −9	+12 0	−12 −17	+12 0	+20 +12	+18 0	+31 +23	3	6
6	10	+90 0	−170 −260	+36 0	−98 −151	+36 0	−25 −61	+22 0	−13 −28	+15 0	−5 −14	+15 0	−1 −10	+15 0	−16 −21	+15 0	+24 +15	+22 0	+37 +28	6	10
10	18	+110 0	−205 −315	+43 0	−120 −186	+43 0	−32 −75	+27 0	−16 −34	+18 0	−6 −17	+18 0	−1 −12	+18 0	−20 −25	+18 0	+29 +18	+27 0	+44 +33	10	18
18	30	+130 0	−240 −370	+52 0	−149 −226	+52 0	−40 −92	+33 0	−20 −41	+21 0	−7 −20	+21 0	−1 −14	+21 0	−24 −29	+21 0	+35 +22	+33 0	+54 +41	18	30
30	40	+160 0	−280 −440	+62 0	−180 −275	+62 0	−50 −112	+39 0	−25 −50	+25 0	−9 −25	+25 0	−2 −18	+25 0	−28 −34	+25 0	+42 +26	+39 0	+64 +48	30	40
40	50	+160 0	−290 −450	+62 0	−180 −275	+62 0	−50 −112	+39 0	−25 −50	+25 0	−9 −25	+25 0	−2 −18	+25 0	−28 −34	+25 0	+42 +26	+39 0	+64 +48	40	50
50	65	+190 0	−330 −520	+74 0	−220 −334	+74 0	−60 −134	+46 0	−29 −59	+30 0	−10 −29	+30 0	−2 −21	+30 0	−33 −40	+30 0	+51 +32	+46 0	+76 +59	50	65
65	80	+190 0	−340 −530	+74 0	−220 −334	+74 0	−60 −134	+46 0	−29 −59	+30 0	−10 −29	+30 0	−2 −21	+30 0	−33 −40	+30 0	+51 +32	+46 0	+76 +59	65	80
80	100	+220 0	−390 −610	+87 0	−260 −390	+87 0	−72 −159	+54 0	−34 −71	+35 0	−12 −34	+35 0	−3 −25	+35 0	−38 −47	+35 0	+59 +37	+54 0	+89 +71	80	100
100	120	+220 0	−400 −620	+87 0	−260 −390	+87 0	−72 −159	+54 0	−34 −71	+35 0	−12 −34	+35 0	−3 −25	+35 0	−38 −47	+35 0	+59 +37	+54 0	+89 +71	100	120
120	140	+250 0	−450 −710	+100 0	−305 −448	+100 0	−85 −185	+63 0	−39 −83	+40 0	−14 −39	+40 0	−3 −28	+40 0	−45 −54	+40 0	+68 +43	+63 0	+103 +83	120	140
140	160	+250 0	−460 −720	+100 0	−305 −448	+100 0	−85 −185	+63 0	−39 −83	+40 0	−14 −39	+40 0	−3 −28	+40 0	−45 −54	+40 0	+68 +43	+63 0	+103 +83	140	160
160	180	+250 0	−480 −740	+100 0	−305 −448	+100 0	−85 −185	+63 0	−39 −83	+40 0	−14 −39	+40 0	−3 −28	+40 0	−45 −54	+40 0	+68 +43	+63 0	+103 +83	160	180
180	200	+290 0	−530 −820	+115 0	−355 −511	+115 0	−100 −215	+72 0	−44 −96	+46 0	−15 −44	+46 0	−4 −33	+46 0	−51 −63	+46 0	+79 +50	+72 0	+120 +96	180	200
200	225	+290 0	−550 −840	+115 0	−355 −511	+115 0	−100 −215	+72 0	−44 −96	+46 0	−15 −44	+46 0	−4 −33	+46 0	−51 −63	+46 0	+79 +50	+72 0	+120 +96	200	225
225	250	+290 0	−570 −860	+115 0	−355 −511	+115 0	−100 −215	+72 0	−44 −96	+46 0	−15 −44	+46 0	−4 −33	+46 0	−51 −63	+46 0	+79 +50	+72 0	+120 +96	225	250
250	280	+320 0	−620 −940	+130 0	−400 −571	+130 0	−110 −240	+81 0	−49 −108	+52 0	−17 −49	+52 0	−4 −36	+52 0	−57 −72	+52 0	+88 +56	+81 0	+137 +108	250	280
280	315	+320 0	−650 −970	+130 0	−400 −571	+130 0	−110 −240	+81 0	−49 −108	+52 0	−17 −49	+52 0	−4 −36	+52 0	−57 −72	+52 0	+88 +56	+81 0	+137 +108	280	315
315	355	+360 0	−720 −1 080	+140 0	−440 −619	+140 0	−125 −265	+89 0	−54 −119	+57 0	−18 −54	+57 0	−4 −40	+57 0	−62 −78	+57 0	+98 +62	+89 0	+151 +119	315	355
355	400	+360 0	−760 −1 120	+140 0	−440 −619	+140 0	−125 −265	+89 0	−54 −119	+57 0	−18 −54	+57 0	−4 −40	+57 0	−62 −78	+57 0	+98 +62	+89 0	+151 +119	355	400
400	450	+400 0	−840 −1 240	+155 0	−480 −687	+155 0	−135 −290	+97 0	−60 −131	+63 0	−20 −60	+63 0	−5 −45	+63 0	−67 −86	+63 0	+108 +68	+97 0	+165 +131	400	450
450	500	+400 0	−880 −1 280	+155 0	−480 −687	+155 0	−135 −290	+97 0	−60 −131	+63 0	−20 −60	+63 0	−5 −45	+63 0	−67 −86	+63 0	+108 +68	+97 0	+165 +131	450	500
		Slack fit		Loose fit		Easy fit		Normal fit		Close fit		Slide fit		Push fit		Drive fit		Force fit			

British Standard data sheet BS 4500A; selected ISO fits – hole basis