1305/314 PLUMBING CRAFT THEORY June/July 2016 Time: 3 hours



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# THE KENYA NATIONAL EXAMINATIONS COUNCIL

## PLUMBING CRAFT CERTIFICATE

### PLUMBING CRAFT THEORY

3 hours

#### INSTRUCTIONS TO CANDIDATES

Cetty cond

You should have the following for this examination: Drawing instruments; Mathematical table/scientific calculator; Answer booklet, This paper consists of EIGHT questions. Answer FIVE questions. All questions carry equal marks. Maximum marks for each part of a question are indicated. Candidates should unswer the questions in English.

This paper consists of 4 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

D 2016 The Kenya National Examinations Council

Turn over

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1 (a) Differentiate between ferrous and non-ferrous metals. State two examples in each case. (4 marks) 1 (a) Differentiate between ferrous and non-ferrous metals. State two examples in each (4 marks) 1 (b) State four reasons for alloying metals. (4 marks) 1 (c) Outline five design principles of direct cylinder system of hot water supply 1 (a) List three classifications of fire. State suitable extinguishing agent for each class 1 (c) Calculate the power output of a centrifugal pump which can lift 200 litters from a shallow well 6 m deep in 10 seconds. (5 marks) 2 (c) Explain the following safety presentions observed in a plumbing workshor. 2 (c) Explain the following safety presentions observed in a plumbing workshor. 2 (c) State four characteristics of a domestic cold water system. (6 marks) 3 (c) State two classes of mild steel pipes, stating their colour coding and the use of each. (7 marks) 3 (c) State two classes of mild steel pipes, stating their colour coding and the use of each. (7 marks) 3 (c) State two classes of mild steel pipes, stating their colour coding and the use of each. (7 marks) 4 (c) Define the tern alloy. 4 (c) Define the tern allow. 4 (c) Define the tern allow. 4 (c) A fourteen storey building is to be supplied with water from the mains. The mains (c) marks. (c) marks: (c) marks. (c)			Traves Galain lion - Cast 1000 - Cast	tvet.com
<ul> <li>1. (a) Differentiate between ferrous and non-ferrous metals. State two examples in each case. (4 marks)</li> <li>State four reasons for alloying metals. (4 marks)</li> <li>Outline five design principles of direct cylinder system of hot water supply with the supply of the water case (4 marks)</li> <li>(c) Outline five design principles of direct cylinder system of hot water supply with the supply of the water case (4 marks)</li> <li>(d) Liest three elasethetications of fire. State suitable extinguishing agent for each class (4 marks)</li> <li>(e) Calculate the power output of a centrifugal pump which can lift 200 litres from a shallow well 6 m deep in 10 seconds. (5 marks)</li> <li>(f) Explain the following safety precutions observed in a plumbing workshop.</li> <li>(g) clothing; Class A = 40°</li> <li>(h) behaviour; Class A = 40°</li> <li>(ii) solf-care. And the following safety precutions observed in a plumbing workshop.</li> <li>(iii) solf-care. And the following safety precutions observed in a plumbing. (6 marks)</li> <li>(iii) State four characteristics of a domestic building.</li> <li>(iii) State two classes of mild steel pipes, stating their colour coding and the use of each. (1 marks)</li> <li>(iii) State two classes of mild steel pipes, stating their colour coding and the use of each. (1 marks)</li> <li>(iii) State two classes of mild steel pipes, stating their colour coding and the use of each. (1 marks)</li> <li>(iii) State the net alloy.</li> <li>(iii) State four the start of 30°C. (1 marks)</li> <li>(iii) State four the term alloy.</li> <li>(iii) State four the term alloy.</li> <li>(iii) State four the term alloy.</li> <li>(iii) Define the term alloy.</li> <li>(iii) State four the term alloy.</li> <li>(iii) Define the term alloy. (1 marks)</li> </ul>			Case bo not Contain (101) ->	trot.com
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<ul> <li>32 (ii) self-care.</li> <li>34 (c) (i) Sketch and label a direct cold water system in a domestic building.</li> <li>(ii) State four characteristics of a domestic cold water supply system. (9 marks)</li> <li>(i) State two classes of mild steel pipes, stating their colour coding and the use of each. (3 marks)</li> <li>(ii) State any five characteristics of a drainage system. (5 marks)</li> <li>(ii) State any five characteristics of a drainage system. (7 marks)</li> <li>(ii) Define the term alloy.</li> <li>(i) Define the term alloy.</li> <li>(ii) State the metal composition of: <ol> <li>b brass, - Coffe and 30°C</li> <li>b brass, - Coffe and 30°C</li> <li>b braze, - Coffe and 30°C</li> <li>(5 marks)</li> </ol> </li> <li>4. (a) A fourteen storey building is to be supplied with water from the mains. The mains pressure is 300 Kps and the water can be pumped directly from the mains.</li> <li>(i) Determine the floor height to which the pressure from the mains can supply.</li> <li>(ii) Hustrate the supply of the water to all the floors. (12 marks)</li> </ul>	\$0-74		(ii) behaviour Class (3 =) fain's	
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<ul> <li>(a) (a) State two classes of mild steel pipes, stating their colour coding and the use of each. (3 marks)</li> <li>(b) State any five characteristics of a drainage system. (5 marks)</li> <li>(c) State any five characteristics of a drainage system. (7 marks)</li> <li>(d) Define the term alloy.</li> <li>(e) Define the term alloy.</li> <li>(f) State the metal composition of:</li> <li>(g) brass, - Gff A3AC</li> <li>(h) brass</li> <li>(h) brass<th>%</th><th>(c)</th><th></th><th></th></li></ul>	%	(c)		
<ul> <li>of each. (3 marks)</li> <li>(ii) State any five characteristics of a drainage system. (5 marks)</li> <li>(iii) State any five characteristics of a drainage system. (5 marks)</li> <li>With the aid of a labelled sketch differentiate between "leftward" and "rightward" welding techniques. (7 marks)</li> <li>(i) Define the term alloy.</li> <li>(ii) State the metal composition of: <ol> <li>brass, - Coffer and 3.%</li> <li>bronze, Coffer and 3.%</li> <li>bronze, Coffer and 3.%</li> </ol> </li> <li>4. (a) A fourteen storey building is to be supplied with water from the mains. The mains pressure is 300 Kpa and the water can be pumped directly from the mains.</li> <li>(i) Determine the floor height to which the pressure from the mains can supply.</li> <li>(ii) Hustrate the supply of the water to all the floors. (12 marks)</li> </ul>			(ii) State four characteristics of a domestic cold water supply system.	(9 marks)
<ul> <li>of each. (3 marks)</li> <li>(i) State any five characteristics of a drainage system. (5 marks)</li> <li>(ii) State any five characteristics of a drainage system. (5 marks)</li> <li>With the aid of a labelled sketch differentiate between "leftward" and "rightward" welding techniques. (7 marks)</li> <li>(i) Define the term alloy.</li> <li>(ii) State the metal composition of: <ol> <li>brass, - Coffe and 3.%</li> <li>bronze, Coffe and 3.%</li> <li>bronze, Coffe and 3.%</li> </ol> </li> <li>4. (a) A fourteen storey building is to be supplied with water from the mains. The mains pressure is 300 Kpa and the water can be pumped directly from the mains.</li> <li>(i) Determine the floor height to which the pressure from the mains can supply.</li> <li>(ii) Hustrate the supply of the water to all the floors. (12 marks)</li> </ul>	2/	10	(i) State two alonger of mild start sizes, stating their solaur and ing and	thomas 1
<ul> <li>(ii) State any five characteristics of a drainage system. (5 marks)</li> <li>(iii) State any five characteristics of a drainage system. (5 marks)</li> <li>With the aid of a labelled sketch differentiate between "leftward" and "rightward" welding techniques. (7 marks)</li> <li>(i) Define the term alloy.</li> <li>(ii) State the metal composition of: <ol> <li>brass; - Ceffer and 3.°C</li> <li>bronze, Operation</li> </ol> </li> <li>4. (a) A fourteen storey building is to be supplied with water from the mains. The mains pressure is 300 Kpa and the water can be pumped directly from the mains.</li> <li>(i) Determine the floor height to which the pressure from the mains can supply.</li> <li>(ii) Illustrate the supply of the water to all the floors. (12 marks)</li> </ul>	11	(a)		
With the aid of a labelled sketch differentiate between "leftward" and "rightward" welding techniques. (7 marks)         (a)       Define the term alloy.         (b)       Define the term alloy.         (c)       Define the term alloy.         (i)       State the metal composition of:         (i)       brass, - Coffe and 3.°         (j)       brass, - Coffe and 3.°         (j)       bronze. (j)	in Ed			and the second
welding techniques.       (7 marks)         (i)       Define the term alloy.         (ii)       State the metal composition of:         1)       brass; - Coff and 3 and         1)       brass; - Coff and 3 and         1)       brass; - Coff and 3 and         1)       bronze; Operation         4.       (a)         A fourteen storey building is to be supplied with water from the mains. The mains pressure is 300 Kpa and the water can be pumped directly from the mains.         (i)       Determine the floor height to which the pressure from the mains can supply.         (ii)       Illustrate the supply of the water to all the floors.	11207	7		A CONTRACTOR
<ul> <li>(i) Define the term alloy.</li> <li>(ii) State the metal composition of: <ol> <li>brass; - Coffee and 3.°C</li> <li>bronze, Upperform</li> </ol> </li> <li>4. (a) A fourteen storey building is to be supplied with water from the mains. The mains pressure is 300 Kpa and the water can be pumped directly from the mains.</li> <li>(i) Determine the floor height to which the pressure from the mains can supply.</li> <li>(ii) Illustrate the supply of the water to all the floors. (12 marks)</li> </ul>	Xd	(b)		
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<ul> <li>brass, - Giffe and 3.°C</li> <li>bronze, Operation (5 marks)</li> <li>(6 marks)</li> <li>(7 marks)</li> <li>(9) A fourteen storey building is to be supplied with water from the mains. The mains pressure is 300 Kpa and the water can be pumped directly from the mains.</li> <li>(1) Determine the floor height to which the pressure from the mains can supply.</li> <li>(1) Illustrate the supply of the water to all the floors. (12 marks)</li> </ul>	1/1	107	A STATUTE CONTRACTOR AND A STATUTE AND A ST A STATUTE AND A STATUTE A	
<ul> <li>4. (a) A fourteen storey building is to be supplied with water from the mains. The mains pressure is 300 Kpa and the water can be pumped directly from the mains.</li> <li>(i) Determine the floor height to which the pressure from the mains can supply.</li> <li>(ii) Illustrate the supply of the water to all the floors. (12 marks)</li> </ul>	AT	C .		
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<ul> <li>4. (a) A fourteen storey building is to be supplied with water from the mains. The mains pressure is 300 Kpa and the water can be pumped directly from the mains.</li> <li>(i) Determine the floor height to which the pressure from the mains can supply.</li> <li>(ii) Illustrate the supply of the water to all the floors. (12 marks)</li> </ul>	F		II) bronze_ Cope and kn	(5 marks)
(i)       Determine the floor height to which the pressure from the mains can supply.         (ii)       Illustrate the supply of the water to all the floors.         (12 marks)	-	-		And the second second
<ul> <li>(i) Determine the floor height to which the pressure from the mains can supply.</li> <li>(ii) Illustrate the supply of the water to all the floors. (12 marks)</li> </ul>	4.	(8)		mains
(ii) Illustrate the supply of the water to all the floors. (12 marks)			pressure is 300 kpa and the water can be pumped directly from the mains.	
(ii) Illustrate the supply of the water to all the floors. (12 marks)			(i) Determine the floor height to which the pressure from the mains can	supply.
(b) With the aid of a skatch availain how an A C are walding set operates (8 marks)				
(h) With the aid of a skatch availain how an A C are welding set operates (8 marks)				
(b) whit use and by a sector explain now an A.C. are wearing set operates. (o marks)		(b)	With the aid of a sketch explain how an A.C. arc welding set operates.	(8 marks)
		10	What also and the design of the large state of the second state of	
<ol> <li>(a) With the aid of a sketch explain how a grinnel-type quartzoid sprinkler operates.</li> <li>(8 marks)</li> </ol>	7.	(a)	whith the aid of a sketch explain now a grinner-type quartzoid sprinkler open	
(b) Sketch and label a joint between a water tank and a distribution pipe. (6 marks)		(b)	Sketch and label a joint between a water tank and a distribution pine	
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(c)

Calculate the diameter of a pipe in millimeters used to discharge 1.25 litres of water per second when the constant head is 4 m and the total length of the pipe is 45.5 m

Take:

$$=\sqrt{\left(\frac{d^{4}\times H}{25\times L\times 10^{4}}\right)}$$

Where:

- q = discharge through pipe in l/s.
  - d = diameter of pipe in mm. H = head of water in m.
  - L = total length of pipe in m.

(6 marks)

(8 marks)

(6 marks)

(4 marks)

(4 marks)

Turn over

(a)

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7

- Sketch and label a single stack drainage system in a two storey building showing the common appliances. (12 marks)
- (b) State four Kenya Building code requirements for sanitary appliances. (4 marks)
- Calculate the amount of heat required to raise the temperature of 250 litres of (c) water from 20° C - 100° C. Take specific heat capacity of water = 4.18 Kj. (4 marks)
- Estimate the cost of installing sanitary appliances using the information given in (a) table 1.

Table 1

Item No.	Description	Quantity	Unit cost	The
1	Water closet and cistern	2 No.	3,750	128
2	Bath tub	1 No.	7,850	791
3	Wash hand basin	2 No.	1,900	in t
Allowance	:5		37501	2 = 19/1000

- Labour at 10% cost of appliance. D
- 11) Overheads at 5% cost of appliance.
- III) Profit at 8% cost of appliance.

(b) Outline four functions of the coating in an arc welding electrode.

With the aid of sketches show the sequence of forming a single-lock welt. (c) (6 marks)

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- State the procedure of tinning a soldering bit. (a)
  - (b) List four positions where manholes are used in drainage systems.

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(c)	(i)	Define the following terms as used in water treatment.			
		I) Coagula II) Dechlor	ation. ination.	(4 marks)	
	(ii)	Name two redu	cing agents used in water treatment.	(2 marks)	
(d)	List four properties of a coagulant.			(6 marks)	



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