

Thursday 13 June 2019 – Morning LEVEL 1/2 CAMBRIDGE NATIONAL IN SYSTEMS CONTROL IN ENGINEERING

R113/01 Electronic principles

Time allowed: 1 hour

Candidates answer on the Question Paper.

OCR supplied materials:
None

Other materials required:

• A calculator may be used



Please write clearly in black ink	Do not write in the barcodes.	
Centre number	Candidate number	
First name(s)		
Last name		

INSTRUCTIONS

- Use black ink. HB pencil may be used for graphs and diagrams only.
- · Answer all the questions.
- Write your answer to each question in the space provided. If additional space is required, you should use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.

INFORMATION

- The total number of marks for this paper is 60.
- The number of marks for each question is given in brackets [] at the end of the question or part question.
- · Dimensions are in millimetres unless stated otherwise.
- Quality of written communication will be assessed in questions marked with an asterisk (*).
- This document consists of 8 pages. Any blank pages are indicated.



Answer all questions.

1 (a) Complete the table using a tick (\checkmark) to identify **three** types of power supply.

Components	Power supply (✓)
Diode	
230 V AC socket	
Operational amplifier	
NPN Transistor	
12 V DC Battery	
Solar Panel	

[3]

(b)	Calculate the potential difference, in volts, across a coil if the coil resistance is 15 Ω and the current flowing through the coil is 800 mA.
	[3]
(c)	Calculate the power input, in watts, to a motor taking a current of 4A from a 6V DC supply.
	[2]
(d)	Calculate the energy, in joules, used by a 50 W lamp in 2 minutes.

2 (a) Fig. 1 shows part of a circuit diagram.

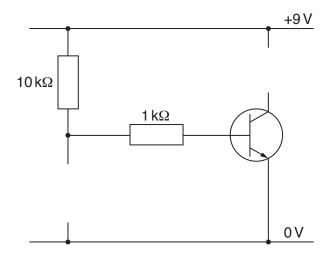


Fig. 1

- (i) Complete the circuit diagram in Fig. 1 using an NTC thermistor as an input transducer and a signal lamp as an output transducer. [2]

[3]

(a)	Explain with comparator.	the aid	of a	a diagram	the fu	nction	of an	operationa	l amplifier	being	used	as a
					•••••							
	•••••											
<i>(</i> 1.)												
(b)	Use notes a integrated cir		ches	s to descri	be the	trigge	er sig	nal and out	put signal	of a r	nonos	table
												o
(0)	Complete the		abla	holow for t	ho foll		two i	nout gatas: 4	D and N			[3
(c)	Complete the	ว แนนา โ	avie	DGIOW IOI (116 1011	JWIIIG	two-II	ipui gaies.	on and in	JN.		

Input A	Input B	OR gate output	NOR gate output
0	0		
0	1		
1	0		
1	1		

3

Microphone

Multimeter

4 (a) From the following list identify **four** items of test equipment for electronic circuits.

Logic probe

	Power s	upply unit Relay	1	
	Residual current device	Signal generator	Solenoid	
1				
2				
3				
4				
				[4]

(b) The activities necessary for placing a component on a printed circuit board using a pick and place manufacturing process are shown below, but they are not in the correct sequence.

Complete the table, using numbers 1 to 7, to put the activities in their correct sequence. One has been done for you.

Activity	Sequence
Carry out a quality assurance check	
Check that the components are ready and available	
Check that the robot is switched on and programmed to carry out the manufacturing process	1
Place the component on the printed circuit board	
Check that the vacuum suction cups are working	
Rotate the robotic arm to the correct orientation	
Use the vacuum suction cups to lift the component	

[6]

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5	(a)	(i)	Describe how a residual current device (RCD) operates.
			[3]
		(ii)	Explain why RCDs are compulsory in new electrical installations.
			[3]
	(b)		e four benefits to a manufacturer of using surface mount components compared to ugh hole components.
		1	
		2	
		3	
		4	[4]

)*	Discuss the function and application of a solenoid as an output device.
	[0
	Name four types of output device that act as a display in electronic equipment.
	1
	2
	3
	4
	[4

END OF QUESTION PAPER

6

ADDITIONAL ANSWER SPACE

If additional must be cle	al space is required, you should use the following lined page(s). The early shown in the margin(s).	The question number(s)
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