

LOCATION: SWANSEA

LLEOLIAD: ABERTAWE

LEVEL 5

LEFEL 5

EXAMINATION PERIOD

CYFNOD ARHOLIADAU

MAY 2022

MAI 2022

MODULE CODE: ACDB4002

ELECTRICAL AND ELECTRONIC PRINCIPLES

TIME: 2 HOURS

ANSWER ALL QUESTIONS

Equipment or materials required –Approved Calculators, Formula Sheet

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Question 1: (15 Marks)

- (a) What is the resistance of a coil which draws a current of (a) 50 mA and (b) 200 μ A from a 120V supply?
- (b) An electric kettle has a resistance of 30. What current will flow when it is connected to a 240V supply? Also find the power rating of the kettle.

Question 2: (15 Marks)

Two resistors are connected in series across a 24V supply and a current of 3A flows in the circuit. If one of the resistors has a resistance of 2 determine

- (a) the value of the other resistor, and
- (b) the *p. d.* across the 2 resistors. If the circuit is connected for 50 hours, how much energy is used?

Question 3: (15 Marks)

- (a) A 12V battery is connected across a load having a resistance of 40. Determine the current flowing in the load, the power consumed, and the energy dissipated in 2 minutes.
- (b) Electrical equipment in an office takes a current of 13A from a 240V supply. Estimate the cost per week of electricity if the equipment is used for 30 hours each week and 1 kWh of energy costs 12.5p

Question 4: (15 Marks)

Three identical lamps A, B and C are connected in series across a 150V supply. State (a) the voltage across each lamp, and (b) the effect of lamp C failing.

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Question 5: (10 Mark)

Capacitances of 3 μ F, 6 μ F and 12 μ F are connected in series across a 350V supply. Calculate

- (a) the equivalent circuit capacitance, (b) the charge on each capacitor, and (c) the *p. d.* across each capacitor.

Question 6: (15 Marks)

- (a) A direct current of 4A flows into a previously uncharged 20 μ F capacitor for 3ms. Determine the p. d. between the plates.
- (b) At what velocity must a conductor 75 mm long cut a magnetic field of flux density 0.6 T if an e. m. f. of 9V is to be induced in it? Assume the conductor, the field and the direction of motion are mutually perpendicular.

Question 7: (15 Marks)

- (a) A conductor of length 15 cm is moved at 750 mm/s at right-angles to a uniform flux density of 1.2 T. Determine the e. m. f. induced in the conductor.
- (b) The wingspan of a metal aeroplane is 36 m. If the aeroplane is flying at 400 km/h, determine the e. m. f. induced between its wing tips. Assume the vertical component of the earth's magnetic field is 40 μ T.