

CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD
Technical and Vocational Education Examination

7250 Electrical and Electronic Circuits 1

JUNE 2020

ADVANCED LEVEL

Specialty(Specialty Code)	Electrical Power Systems – EPS (F3)
Centre N°	
Centre Name	
Candidate N°	
Candidate Name	

Mobile phones are **NOT** allowed in the examination room

7250 CIRCUIT ANALYSIS 1: MULTIPLE CHOICE QUESTION PAPER

One and a half hours

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you start answering the questions in this paper. Make sure you have a soft HB pencil and an eraser for this examination.

1. USE A SOFT HB PENCIL THROUGHOUT THE EXAMINATION.
2. DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

Before the examination begins:

3. Check that this question booklet is headed **Advanced Level – 7250 Circuit Analysis 1**
4. Insert the information required in the spaces above.
5. Insert the information required in the spaces provided on the answer sheet using your HB pencil:
Candidate Name, Exam Session, Subject Code, Centre Number and Candidate Number. Take care that you do not crease or fold the answer sheet or make any marks on it other than those asked for in these instructions.
6. **Answer ALL questions**
7. Each question has **FOUR** suggested answers: **A, B, C** and **D**. Decide on which answer is correct. Find the number of the question on the Answer Sheet and draw a horizontal line across the letter to join the square brackets for the answer you have chosen.
For example, if **C** is your correct answer, mark **C** as shown below:
[A] [B] [C] [D]
8. Mark only one answer for each question. If you mark more than one answer, you will score a zero for that question. If you change your mind about an answer, erase the first mark carefully, then mark your new answer.
9. Avoid spending too much time on any one question. If you find a question difficult, move on to the next question. You can come back to this question later.
10. Do all rough work in this booklet, using, where necessary, the blank spaces in the question booklet.
11. Texts, notes and pre-prepared materials of any kind are also **NOT** allowed in the examination room.
12. **At the end of the examination, the invigilator shall collect the answer sheet first and then the question booklet after. DO NOT ATTEMPT TO LEAVE THE EXAMINATION HALL WITH IT.**

Turn Over

1. If the inputs of an exclusive OR gate are of P and N, the output S will be

- A $S = \overline{PN} + PN$
 B $S = \overline{PN} + \overline{PN}$
 C $S = \overline{PN} + PN$
 D $S = \overline{\overline{PN} + PN}$

2. If a 220V heater is used on 110V supply, heat produced by it will be

- A One-half
 B twice
 C one-fourth
 D four times

3.

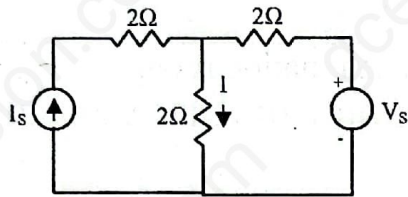


Figure 1

In the diagram shown in figure 1, the value of V_s is 0, when $I = 4A$. For $V_s = 16V$, I will be

- A 6A
 B 8A
 C 10A
 D 12A

4. The output characteristic curve for NPN transistor is obtained by plotting the function $I_c = f(V_{ce})$ for given constant values of

- A gate current i_g
 B base current i_b
 C emitter current i_e
 D dynamic resistance r_{cc}

5.

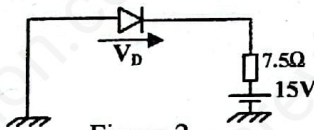


Figure 2

The approximate value of voltage V_D across the diode in figure 2 is

- A 0V
 B 5V
 C 10V
 D 15V

6. Power factor is the

- A ratio of true power to apparent power
 B peak power times 0.707
 C sine of the phase difference between V and I
 D cosine of the phase angle between active power and apparent power

7. One coulomb per-second is equal to one :

- A Watt
 B Joule
 C Volt
 D ampere

8.

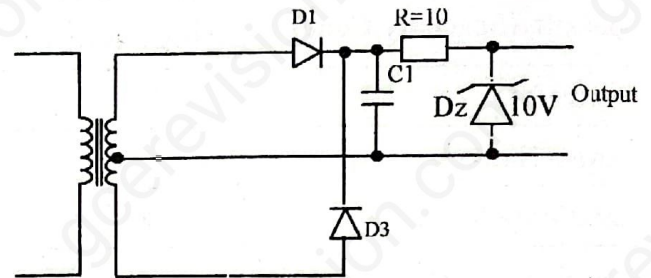


Figure 3

In figure 3, a voltage level of 20V is measured at the output of the power supply with no load attached. What is the possible cause ?

- A R_1 shorted
 B C_1 open
 C D_1 shorted
 D D_z open

9.

The leads of a multimeter are across a diode in the following manner: red lead connects to the end of diode with marking band, and the black lead connects on other end. What does a reading of -0.6 volts indicate ?

- A Forward bias leads connected with proper polarity
 B Reverse bias, leads connected with proper polarity
 C Forward bias, leads connected with reverse polarity
 D Reverse bias, leads connected with reverse polarity

10.

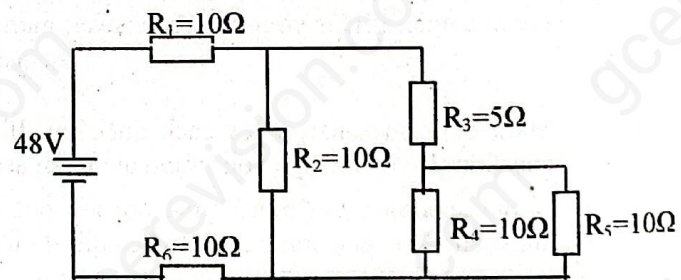


Figure 4

What is the total resistance of the circuit in figure 4 ?

- A 10Ω
 B 25Ω
 C 40Ω
 D 55Ω

11. The capacitance of a capacitor is NOT influenced by
- plate thickness
 - plate area
 - plate separation
 - nature of the dielectric

13. For a given line voltage, four heating coils will produce maximum heat when connected
- All in parallel
 - All in series
 - With two parallel pairs in series
 - One pair in parallel with the other two in series

14. Two similar electric charges of 1C are placed 1m apart in air. The repulsive force between them is
- 1N
 - 9×10^9 N
 - 4πN
 - 8.84×10^{-12}

15. An ac current given by $i = 14.14 \sin(\omega t + \pi/6)$ has a phase angle of
- 180°
 - 30°
 - -30°
 - 210°

16. Two sinusoidal currents are given by the equations
- $$i_1 = 10 \sin\left(\omega t + \frac{\pi}{3}\right) \text{ and } i_2 = 10 \sin\left(\omega t - \frac{\pi}{4}\right)$$
- The phase difference between them is
- 105°
 - 75°
 - 15°
 - 60°

17. If a complex current equation is given by $i = 5 + 5 \sin 100\pi t$ ampere. Its average value is
- 10A
 - 0A
 - $\sqrt{50}$ A
 - 5A

18. The operation i has a value of
- +1
 - 1
 - $\sqrt{-1}$
 - $\sqrt{1}$

19. In the forward region of its characteristics, a diode appears as
- an OFF switch.
 - a high resistance.
 - a capacitor.
 - an ON switch.

20.

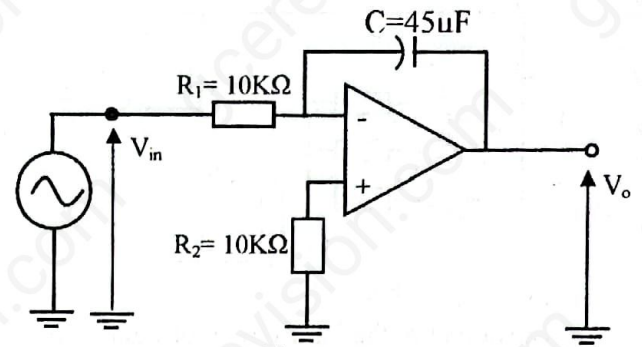


Figure 5

- Figure 5 represents the circuit of
- a differentiator.
 - an integrator.
 - an inverter.
 - an amplifier.

21.

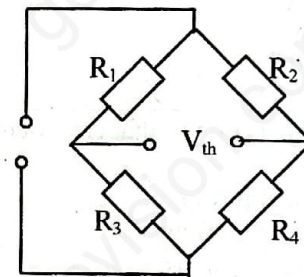


Figure 6

- In figure 6, if $R_1 = R_3 = 20\Omega$, and $R_2 = R_4 = 10\Omega$, the thevenin resistance (R_{th}) is equals to
- 5Ω.
 - 15Ω.
 - 10Ω.
 - 30Ω.

22.

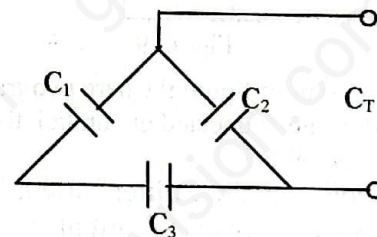


Figure 7

- Considering the circuit of figure 7, the equivalent capacitance (C_T) is given by
- $C_T = C_1 + C_2 + C_3$
 - $C_T = C_1 \times C_2 \times C_3$
 - $C_T = C_3(C_2 + C_3)$
 - $C_T = C_2 + (C_1 C_3 / C_1 + C_3)$

23.

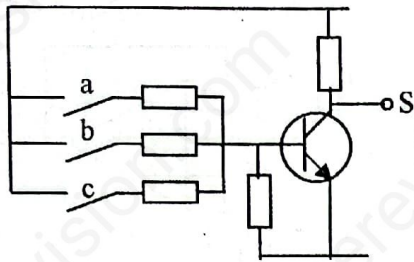


Figure 8

The output of the logic circuit of figure 8 is

- A $S = a + b + c$
- B $S = abc$
- C $S = \bar{a} + \bar{b} + \bar{c}$
- D $S = \bar{a} \cdot \bar{b} \cdot \bar{c}$

24. The symbol "j" in complex numbers represents a counter clock wise rotation of a vector through

- A 90°
- B 180°
- C 360°
- D 270°

25. To realize a counter that can count from 0 to 15, we need

- A two flip flops.
- B three flip flops.
- C four flip flops.
- D six flip flops.

26.

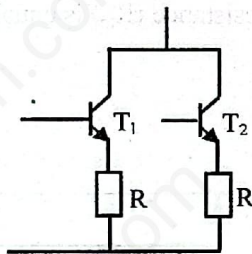


Figure 9

In the circuit of figure 9 where two transistors T_1 and T_2 are connected in parallel, the role of the resistor R is to

- A consume the emitter current
- B prevent collector current disequilibrium
- C limit the emitter current
- D assist in commutation

27. Which of the following is not an advantage of Field Effect Transistor over Bi-Junction Transistor?

- A High input impedance
- B High frequency
- C High power gain
- D High size and high vulnerability to damage

28. The r.m.s. value of a sinusoidal alternating current is equal to its maximum value at an angle of

- A 60°
- B 45°
- C 30°
- D 90°

29. The main function of a voltage regulator is to provide an output voltage that is

- A fluctuating
- B smooth
- C sinusoidal
- D constant

30. According to Kirchoff's Voltage Law, the algebraic sum of all voltage drops and e.m.f. in any close loop of a network is always

- A zero
- B positive
- C negative
- D equals to the current

31. The active power in an a.c. circuit is

- A $VI \cos \phi$
- B $VI \sin \phi$
- C $I^2 Z$
- D $I^2 X_L$

32. Q-factor in a parallel circuit indicates

- A current magnification
- B voltage magnification
- C power magnification
- D voltage and current magnification

33. Kirchoff current law is only applicable to

- A closed loop in networks
- B open loop in networks
- C junctions in networks
- D closed and open loops in networks

34. In an RLC series circuit, maximum current flows when

- A $R = 0$
- B $X_L = X_C$
- C $X_L > X_C$
- D $X_L < X_C$

35. When a transistor supplied with $V_{CC}=30V$ is under saturation, a voltmeter connected across CE shall indicate

- A 0V
- B 15V
- C 20V
- D 30V

36. The modulus of a binary counter that is made up of five flip flops is
- 10
 - 25
 - 32
 - 125

37. In combinational logic, RTL uses
- relays, timers, lamps
 - resistors, transistors, lamps
 - resistors, transistors
 - relays, timers

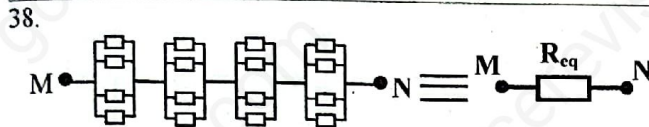


Figure 10

Resistive elements having each a resistance r , arranged as shown in figure 10 shall give an equivalent resistance R_{eq} such that

- $R_{eq} = 4r$
 - $R_{eq} = 25r$
 - $R_{eq} = r$
 - $R_{eq} = 16r$
39. The role of a voltage regulator is to provide
- rectified voltage
 - direct voltage
 - saw tooth voltage
 - stable voltage

40. The total capacitance of two 40mF series-connected capacitors in parallel with a 4mF capacitor is :
- 24mF
 - 5mF
 - 3.8mF
 - 44mF

41. A family of collector-characteristic curves for NPN transistor is obtained by plotting the function $I_C = f(V_{CE})$ for given constant values of
- emitter current i_e
 - dynamic resistance r_{ce}
 - gate current i_g
 - base current i_b

42. The diode which normally operates in the reverse breakdown mode is called the
- signal diode
 - zener diode
 - rectifier diode
 - switching diode

43. If the instantaneous value of an a.c. current is $14.14 \sin(\omega t + \pi/6)$ then the r.m.s. value is
- 10A
 - 14.14A
 - 1.96A
 - 7.07A

44. A load has impedance $Z = 5 \angle 53.1^\circ \Omega$ and a voltage $V = 50 \angle 0^\circ \text{ V}$ across it. The current flowing through this load is
- $I = 250 \angle -53.1^\circ \text{ A}$
 - $I = 250 \angle 53.1^\circ \text{ A}$
 - $I = 10 \angle -53.1^\circ \text{ A}$
 - $I = 10 \angle 53.1^\circ \text{ A}$

45. A combinational logic circuit that channels its input to one of many outputs is called
- counter
 - multiplexer
 - demultiplexers
 - flipflop

46.

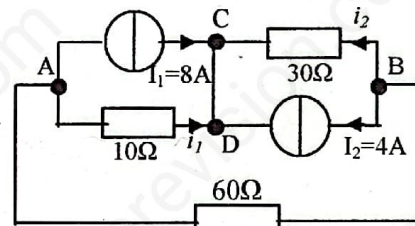


Figure 11

Considering figure 11, the thevenin equivalent resistance seen from AB is

- 40Ω
 - 0Ω
 - 30/4Ω
 - 300Ω
47. The difference between a half adder and a full adder as concerns binary arithmetic addition is
- The number of inverter gates in their circuits
 - the number of inputs
 - the number of outputs
 - The speed of operation

48. In a P-type semiconductor, the majority carriers are
- electrons
 - holes
 - protons
 - photons

49. A four steps rotor resistance starter requires

- A 2 sets of resistors
 - B 4 sets of resistors
 - C 8 sets of resistors
 - D 3 sets of resistors
-

6

50. The condition for maximum efficiency of a transformer is:

- A When transformer loss equal to eddy current
 - B When copper loss equal to eddy current
 - C When copper loss equal to hysteresis loss
 - D When copper loss equal to iron loss
-

NOW GO BACK AND CHECK YOUR WORK