

GENERAL CERTIFICATE OF EDUCATION BOARD
Technical and Vocational Education Examination

JUNE 2025

KAWLO

INTERMEDIATE LEVEL

Specialty Name and Acronym	ELECTRICAL POWER SYSTEMS – EPS
Centre No.	
Centre Name	
Candidate No.	
Candidate Name	

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

5240 ELECTRICAL AND ELECTRONIC CIRCUITS 1: MULTIPLE CHOICE QUESTION PAPER

Duration: 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 “Intermediate Level – 5240 Electrical And Electronic Circuits
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 erase or fold the answer sheet or make any marks on it other than those asked for in these instructions.

How to answer the questions in this examination:

6. Answer **ALL** the 50 questions in this Examination. All questions carry equal marks.
7. Each question has **FOUR** suggested answers: **A, B, C** and **D**. Decide 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. **You must not take this booklet and the answer sheet out of the examination room. All question booklets and answer sheets will be collected at the end of the examination.**

Turn Over

1. Which of the following statements is true for Diodes?
- A They convert dc to ac
 - B They conduct current on both halves of an ac wave
 - C They conduct current only on one half of an ac wave
 - D They furnish ac voltages to different parts of an electronic circuit

2. Half wave rectifiers
- A converts dc to ac
 - B take place when the diode is reverse biased
 - C has an output frequency half that of the input
 - D Has a peak voltage across the load which is approximately 1.44 times of the transformer secondary.

3.

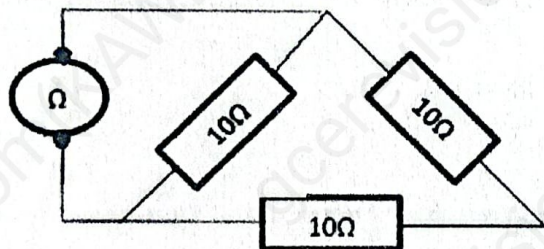


Figure 1

In the circuit of figure 1, the reading of the ohmmeter is:

- A 5Ω
- B 6.67Ω
- C 10Ω
- D 30Ω

4.

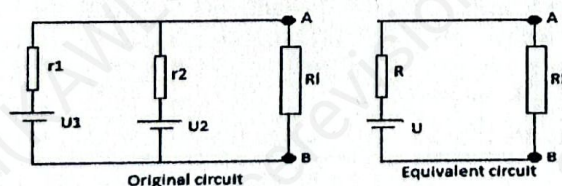


Figure 2

Figure 2 shows an original circuit having a load resistance R_L and its equivalent. Which theorem or law does it explain?

- A Superposition theorem
- B Kirchhoff's law
- C Norton's theorem
- D Thevenin's Theorem

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5.

ab	00	01	11	10
c	1	1	1	0
	0	1	1	0

Figure 3

The Karnaugh map of figure 3 shows a function with inputs a, b and c and output S. The simplified expression of S is:

- A $S = \bar{a}\bar{c} + b$
 - B $S = \bar{a}\bar{c} + \bar{a}b + a.b$
 - C $S = \bar{a}\bar{c} + b.\bar{c} + b.c$
 - D $S = b + \bar{a}\bar{b}\bar{c} +$
6. An a.c source has a voltage $V = 20\sin 300t$ the frequency of the supply:
- A 20Hz
 - B 50Hz
 - C 47.7Hz
 - D 300Hz

7. Rectification is the conversion of

- A a.c to d.c
- B a.c to a.c
- C d.c to a.c
- D d.c to d.c

8. The formula $\frac{\rho l}{A}$ is to determine the

- A resistance of a linear resistor
- B resistance of a non-linear resistor
- C resistance of a conductor
- D resistance of a conductor at variable length

9.

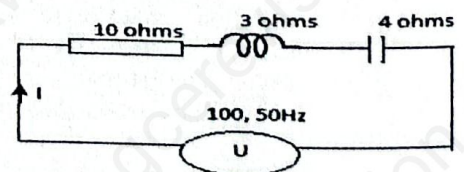


Figure 4

For the circuit of figure 4, if $U=100V, 50Hz$, the value of the current I at resonance is:

- A $I = 10A$
- B $I = 33.3A$
- C $I = 25A$
- D $A = 10.1A$

Go on to the next page

10. A function having an output with expression $a \oplus b$ is called:
- A An OR gate
 - B A NAND gate
 - C A NOR gate
 - D An Exclusive OR gate

11. If two capacitors of $10\mu\text{F}$ each are connected in series the equivalent capacitance is:.
- A $C_T = 10\mu\text{F}$
 - B $C_T = 20\mu\text{F}$
 - C $C_T = 100\mu\text{F}$
 - D $C_T = 5\mu\text{F}$

12.

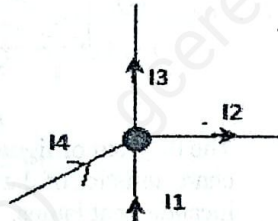


Figure 5

Applying Kirchhoff's current law to the circuit of figure 5 above we have:

- A $I_1 + I_2 + I_3 + I_4 = 0$
 - B $I_1 + I_2 - I_3 - I_4 = 0$
 - C $I_1 + I_3 - I_2 - I_4 = 0$
 - D $I_1 + I_4 - I_3 - I_2 = 0$
13. A sinusoidal voltage $V = 220\text{V}$, 50Hz has a period of:
- A 0.02ms
 - B 20ms
 - C 0.2ms
 - D 2ms

14.

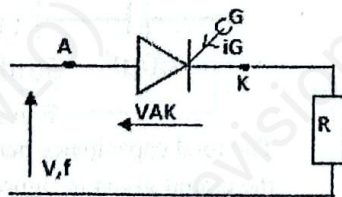


Figure 6

The thyristor in figure 6 will conduct if and only if

- A $V_{AK} > 0$ and $i_G = 0$
- B $V_{AK} < 0$ and $i_G > 0$
- C $V_{AK} < 0$ and $i_G = 0$
- D $V_{AK} > 0$ and $i_G > 0$

15. A non-measuring instrument is:

- A Oscilloscope
- B Galvanometer
- C Clip on ammeter
- D Phase tester

16.

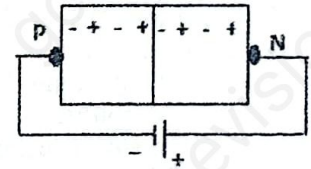


Figure 7

The diode illustrated in figure 7 is:

- A Reverse biased
- B Forward biased
- C Undergoing doping
- D In conduction mode

17.

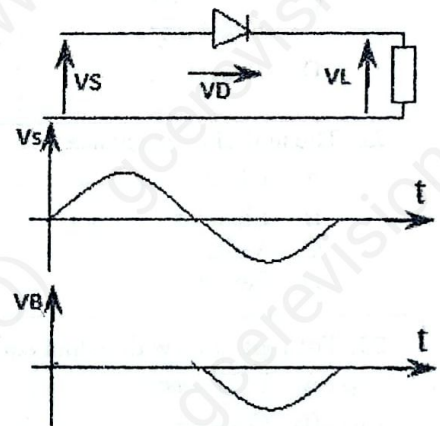


Figure 8

Figure 8 shows a half wave rectifier circuit and some corresponding waveforms. The waveform V_B represent the voltage across:

- A The supply
- B The diode voltage
- C The load
- D The supply and the load

18. To obtain a full wave rectifier using a centre-tapped transformer, how many diodes are needed?

- A 1 diode
- B 2 diodes
- C 4 diodes
- D 1 diode and a capacitive filter

19. The positive charges of an atom are known as:

- A Protons
- B Neutrons
- C Electrons
- D Nucleus

20. Transistors, Diodes, thyristor and UJT are all classified under

- A Switchgears
- B Amplifiers
- C Semiconductor component
- D Rectification

21. The equivalent resistance when four identical resistors of value R each, are connected in parallel is:

- A $Req = R^2$
- B $Req = \frac{R}{4}$
- C $Req = \frac{R^2}{4}$
- D $Req = 4R$

22. The unit of conductance is:

- A Ohms
- B Siemens
- C Volts
- D Henry

23. The logic gate with output equation $X = A+B$

- A NOT gate
- B OR gate
- C AND gate
- D NAND gate

24.



Figure 9

The symbol of figure 9 is that of:

- A Junction diode
- B Zener diode
- C Silicone controlled rectifier
- D Transistor

25. A 100 W electric light bulb is connected to a 250 V supply. Determine the resistance of the bulb:

- A 250000 Ω
- B 625 Ω
- C 0.4 Ω
- D 2.5 Ω

26.

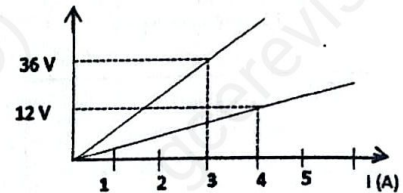


Figure 10

The diagram of figure 10 represents the characteristics of the filament of two incandescent lamps. The respective resistances are:

- A 3 Ω and 4 Ω
- B 3 Ω and 12 Ω
- C 4 Ω and 9 Ω
- D 4 Ω and 12 Ω

27. A phase angle 60 degrees between the current and voltage in an AC electrical distribution system simply means:

- A the frequency is 60 Hz
- B resonance frequency is 60 Hz
- C the power factor is $\cos 60^\circ$
- D the power factor is $\cos 60^\circ$

28.

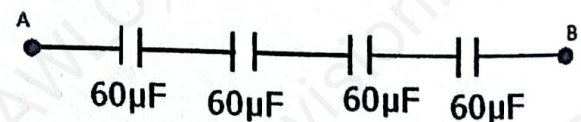


Figure 11

The total capacitance between points A and B of the circuit given in figure 11 is:

- A 15 μF
- B 30 μF
- C 60 μF
- D 240 μF

29.

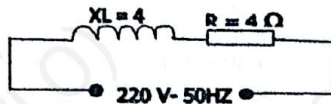


Figure 12

The total impedance of the circuit given in figure 12 is:

- A 4Ω
- B 5.65Ω
- C 16Ω
- D 8Ω

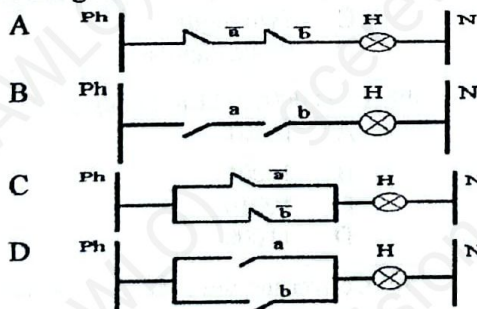
30. The charge on the plates of a capacitor is 6 mC when the potential between them is 2.4 kV. The capacitance of the capacitor is:

- A $0.4 \mu\text{F}$
- B $2.5 \mu\text{F}$
- C 0.000025MF
- D 25mMF

31. The three factors used to determine the resistance of a conductor are:

- A voltage, current and power
- B length, resistivity and diameter
- C cross-sectional area, and current
- D resistivity, cross-sectional area and length

32. The circuit which describes the functioning of an OR gate is:



33.

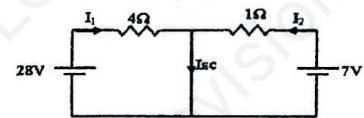


Figure 13

Applying Kirchhoff's current law to the circuit of figure 13, I_{sc} will be:

- A 7A
- B 14A
- C 28A
- D 5A

34.



Figure 14

The output Y of the logic circuit given in figure 14 is:

- A 1
- B 0
- C X
- D \bar{X}

35.

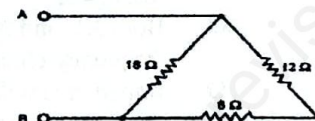


Figure 15

A DC supply of 180V is connected across the terminals AB of the Figure 15. The current in the 6Ω resistor will be

- A 10A
- B 5A
- C 12A
- D 6A

36. The quantity of charge that will be transferred by a current flow of 10A over one hour is:

- A 10C
- B $3.6 \times 10^4 \text{C}$
- C $2.4 \times 10^3 \text{C}$
- D $1.6 \times 10^2 \text{C}$

Turn Over

37. Three cells each of e.m.f. 1.5V and internal resistance 1Ω are connected in parallel. The e.m.f of the combination is:

A 4.5V
B 5V
C 3V
D 1.5V

38. The quantity of charge to be delivered by a battery with potential difference of 100V to do a work of 500J is:

A 5C
B 0.5C
C 50C
D 500C

39. Two electric bulbs rated at the same voltage have powers of 40W and 80W. If their resistances are respectively R_1 and R_2 , then

A $R_1=2R_2$
B $R_2=2R_1$
C $R_2=4R_1$
D $R_2=4R_1$

40. In a series R,L,C circuit,

A Increasing the frequency decreases the resistance
B Increasing the frequency increases the resistance
C Both XL and XC changes with frequency changes
D Impedance will always decrease

41. If three 9mH inductors are connected in parallel without mutual inductance, then the total inductance is:

A 3mH
B 9mH
C 27mH
D 18mH

42. A 16mA current source has an internal resistance of $10k\Omega$. How much current will flow in a $2.5k\Omega$ load connected across its terminals?

A 4.2mA
B 6mA
C 11.5mA
D 12.8mA

43. An electric heater consumes 3.6 MJ when connected to a 250 V supply for 40 minutes. The power rating of the heater is:

A 1000W

B 1500W
C 900W
D 75W

44. The energy stored in a $10\mu\text{F}$ capacitor when charged to 500V is:

A 1.25 mJ
B $0.025\mu\text{J}$
C 1.25 J
D 1.25 C

45. The e.m.f. induced in a coil of inductance 12 H by a current changing at the rate of 4A/s is

A -48V
B 3V
C 16V
D 24V

46. Liquids that are good conductors because of ionization are called:

A Electrodes
B Bases
C Acid
D Electrolytes

47. An electronic component without a gate terminal is a:

A Triac
B SCR
C FET
D Diac

48. A decimal number system has:

A Ten digits
B Nine digits
C Two digits
D Eleven digits

49. BCD 00010111 to binary gives:

A 10101
B 10001
C 10010
D 11000

50. Converting the octal number 614_8 to decimal gives:

A 400
B 384
C 392
D 396

STOP

GO BACK AND CHECK YOUR WORK