

GENERAL CERTIFICATE OF EDUCATION BOARD
 Technical and Vocational Education Examination

JUNE 2022

INTERMEDIATE LEVEL

Specialty Name and Acronym	ELECTRICAL POWER SYSTEMS – EPS (F3)
Centre No. & Name	
Candidate No.	
Candidate Name	

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

5240 ELECTRICAL AND ELECTRONIC CIRCUITS 1: MULTIPLE CHOICE QUESTION PAPER

1 HOUR 30 MINUTES

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.

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

Before the examination begins:

- Check that this question booklet is headed “**Intermediate Level – 5240 Electrical And Electronic Circuits**”
- Insert the information required in the spaces above.
- 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:

- Answer **ALL** the 50 questions in this Examination. All questions carry equal marks.
- 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]

- 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.
- 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.
- Do all rough work in this booklet, using, where necessary, the blank spaces in the question booklet.
- 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.**

1. In the circuit of figure 1, which is the most appropriate name given to it?

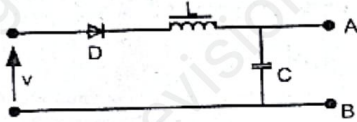


Figure 1

- A Single phase ac circuit with diode, inductor and capacitive load
 B Half wave rectifier circuit with L+C load
 C Half wave rectifier circuit with L+C filter
 D Single phase half wave rectifier circuit with L+C filter

2. The total resistance of the circuit of figure. 2 is

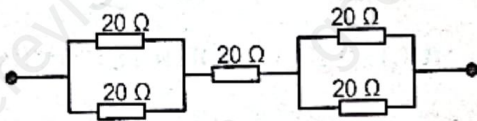


Figure 2

- A $R_T = 40 \Omega$
 B $R_T = 20 \Omega$
 C $R_T = 10 \Omega$
 D $R_T = 100 \Omega$

3. In the case of short circuit,

- A zero current will flow in the circuit
 B very low current will flow in the circuit
 C normal current will flow in the circuit
 D very high current will flow in the circuit

4. When a junction diode is in its forward characteristic, the PN junction behaves like

- A an open switch
 B a closed switch
 C a capacitive region
 D a high resistance region

5. Which of these formulae is that of a lagging power factor?

- A $Z^2 = R^2 + (X_C - X_L)^2$
 B $Z^2 = R^2 + (X_L - X_C)^2$
 C $Z^2 = R^2 + X_C^2 - X_L^2$
 D $Z^2 = R^2 + X_L^2 - X_C^2$

6. In a series circuit containing resistance and capacitance, the most suitable formula to calculate power factor is.

- A $p.f = \frac{X_C}{Z}$
 B $p.f = \frac{Z}{X_C}$
 C $p.f = \frac{R}{Z}$
 D $p.f = \frac{Z}{R}$

7. The evolution between two successive steps in a GRAFCET is conditioned by the

- A Receptivity
 B Directed links
 C Transition
 D Step

8. According to Kirchoff's voltage law, the algebraic sum of all the voltage drops and emfs in any closed loop of a network is always

- A positive
 B zero
 C negative
 D determined by the battery's emfs

9. The binary equivalence of the decimal number 5 is

- A 1010
 B 1001
 C 101
 D 10001

10. Applying Kirchoff's second law in the circuit of figure 3,

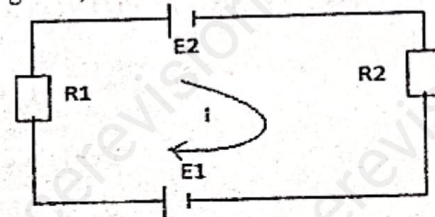


Figure 3

- A $E_1 + E_2 = IR_1 + IR_2$
 B $E_1 + E_2 = IR_1 - IR_2$
 C $E_1 - E_2 = IR_1 - IR_2$
 D $E_1 - E_2 = IR_1 + IR_2$

11. Given figure 4, What type of transistor configuration is the transistor?

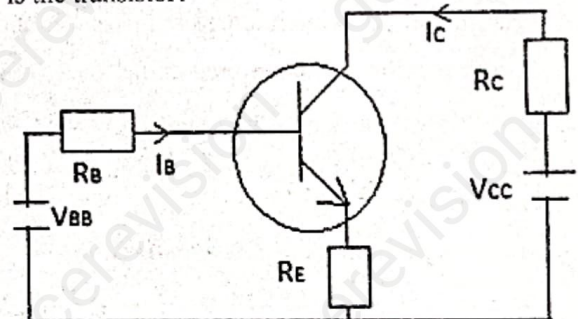


Figure 4

- A Common Base configuration
 B Common Collector configuration
 C Base Emitter configuration
 D Common Emitter configuration

12. What is the capacitive reactance of the circuit of figure 5?

Figure 5

- A $X_C = 145 \Omega$
 B $X_C = 10 \Omega$
 C $X_C = 0.000145 \Omega$
 D $X_C = 0.0069124 \Omega$

13. In the circuit of figure 6, the supply voltage is

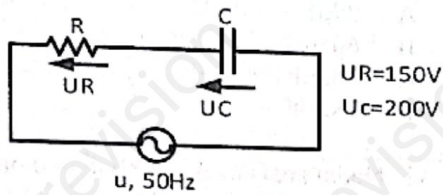


Figure 6

- A $U=350V$
 B $U=250V$
 C $U=200V$
 D $U=150V$

14. An electrical component used to limit the amount of electric current that flows through a circuit is known as

- A diode
 B thermistor
 C transistor
 D resistor

15. In an RL series circuit, the voltages across resistor and inductor are 3V and 4V respectively. What is the applied voltage?

- A 7V
 B 5V
 C 4V
 D 3V

16. According to Boolean algebra $(1+A)$ equals

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

17. An ac series circuit contains a pure resistance of 2Ω and an inductor, the impedance of the circuit being 8.25Ω . What is the reactance of the inductor?

- A $X_L=10.25\Omega$
 B $X_L=6.25\Omega$
 C $X_L=16.5\Omega$
 D $X_L=8\Omega$

18. The truth table below is that of

a	b	S
0	0	1
0	1	0
1	0	0
1	1	0

- A an OR function
 B a NOR function
 C an AND function
 D a NAND function

3

19. If the quantity of electricity passing through a circuit during a time interval of 1min 10secs is 1200C, the current flowing through it will be

- A 12000A
 B 84KA
 C 17.14A
 D 19.41A

20. The voltage at points AB in the circuit of figure 7 given that $R_1 = 1\Omega$, $R_2 = R_3 = 2\Omega$ is

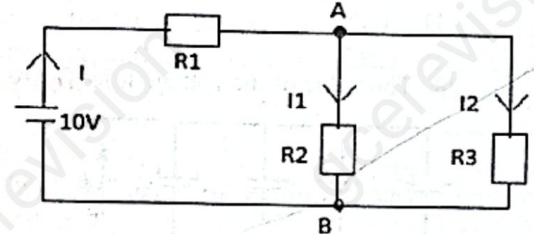


Figure 7

- A $V_{AB}=5V$
 B $V_{AB}=20V$
 C $V_{AB}=12V$
 D $V_{AB}=6V$

21. The value of the resistance of a resistor with the following color code or bands Brown-green-brown-silver is

- A $150\Omega \pm 5\%$
 B $150\Omega \pm 10\%$
 C $150\Omega \pm 20\%$
 D $150\Omega \pm 15\%$

22. The least significant digit (LSD) of the decimal number 27613 is

- A 1
 B 2
 C 3
 D 6

23. Admittance is the reciprocal of

- A conductance
 B capacitance
 C impedance
 D inductance

24. The voltage applied across an R-L circuit is equal to the

- A arithmetic sum of V_L and V_R
 B algebraic sum of V_L and V_R
 C square of the sum of V_L and V_L
 D sum of the multiple of V_L and V_R

25. The 4-bit binary equivalent of the decimal number 4 is

- A 1000
 B 0001
 C 0100
 D 0101

26. Four resistors R_1, R_2, R_3 and R_4 are connected in parallel. Given that $R_1=R_2=R_3=R_4$, what will be the equivalent resistance:

- A $R_1=R_1/4$

- B $R_1=R_1/2$
 C $R_1=R_1$
 D $R_1=R_1/8$

27. A pure resistor of 100 is supplied by a 220V, 50Hz single phase supply. If it draws a current of 2.2A, What is the power factor of the circuit

- A 0
 B 1
 C 0.8
 D 0.86

28. The value of the voltage E in figure 8 is:

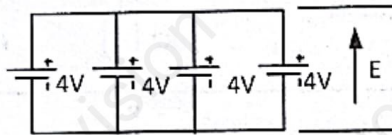


Figure 8

- A $E=4V$
 B $E=16V$
 C $E=1V$
 D $E=2V$

29. The value of the current I in the circuit of figure 9 is

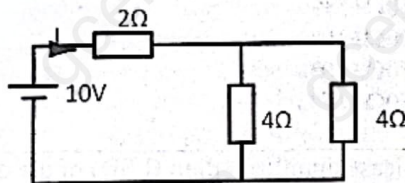


Figure 9

- A 5A
 B 1A
 C 2.5A
 D 10A

30. A conductor carries a current of 800A at right angles in a magnetic field having a density of 0.5T. What is the force on the conductor if the length of the conductor is 1m?

- A $F=0N$
 B $F=1600N$
 C $F=40N$
 D $F=400N$

31. Three 60W bulbs are in parallel across the 60V power line. If one bulb burns out

- A There will be heavy current in the main line
 B The rest of the two bulbs will not light
 C All three bulbs will light
 D The other two bulbs will light

32. The resistance of a 100W lamp supplied across a 220V mains is

- A 4.84Ω
 B 48.4Ω
 C 484Ω
 D 4840Ω

33. Two capacitors of capacitance $9\mu F$ and $18\mu F$ in series will have a total capacitance of

- A $27\mu F$
 B $6\mu F$
 C $162\mu F$
 D $180\mu F$

34. Nodal analysis is mainly based on

- A Kirchoff's current law
 B Kirchoff's voltage law
 C Wheatstone bridge principle
 D Faraday's electric law

35. The root mean square value of voltage with equation $v = 200\sin t$ is

- A 200
 B $\frac{200}{2}$
 C $\frac{2}{200}$
 D $\sqrt{2} \times 200$

36. In an ac circuit active power is dissipated in

- A Resistance only
 B Inductance only
 C Capacitance only
 D Both resistance and inductance

37. A series circuit consist of four resistances of $4.7K\Omega$, $5.6K\Omega$, $9K\Omega$ and $10K\Omega$. Which resistor will have the highest voltage drop across it when supplied by a voltage?

- A $4.7K\Omega$
 B $5.6K\Omega$
 C $9K\Omega$
 D $10K\Omega$

38. A capacitor consist basically of

- A Two conductors separated by a dielectric
 B Two dielectric separated by a conductor
 C Conductors and dielectric
 D Conductors and semiconductors

39. In an ac circuit with X_L and R in series, the

- A Voltage across R and X_L are in phase
 B Voltage across R lags the voltage across X_L by 90°
 C Voltage across R and X_L are 180° out of phase
 D Voltage across R leads the voltage across X_L by 90°

40. The permeability of free space is

- A $4\pi \times 10^{-7} H/M$
 B $8.85 \times 10^{-12} F/M$
 C 0
 D 1

41. In case of electrolytic capacitor, if positive terminal is connected to negative of supply and negative terminal is connected to positive of supply,

- A there will be no effect
- B the capacitor will be damaged
- C the circuit will not work
- D the capacitor will discharged instantly

42. The break-over voltage or knee voltage of a silicon diode is

- A 0.2V
- B 0.8V
- C 0.7V
- D 1.0V

43. Reverse bias resistance of an ideal diode is

- A 10Ω
- B $1M\Omega$
- C Infinity
- D Zero

44. The basic role of a filter is to

- A Minimize variations in ac input signal
- B Suppress harmonics in rectified output
- C Remove ripples from the rectified output
- D Stabilize dc output voltage

45. The binary number 10010_2 in octal is

- A 54
- B 45
- C 37
- D 25

46. The logic symbol of figure.10 represents:



Figure 10

- A An OR gate
- B An AND gate
- C A NOR gate
- D A NAND gate

47. The form factor is the ratio of

- A Peak value to rms value
- B Rms value to average value
- C Average value to rmd value
- D Maximum value to average value

48. The frequency of dc supply is

- A 0Hz
- B 16Hz
- C 25Hz
- D 50Hz

49. The quantity which will remain constant in all part in a series circuit is:

- A Voltage
- B Current
- C Power
- D Resistance

50. Active power and apparent power are respectively represented by

- A KVA and KW
- B KVar and KVA
- C KVA and KVAr
- D KW and KVA

STOP

NOW GO BACK AND CHECK YOUR WORK