GENERAL CERTIFICATE OF EDUCATION BOARD
Technical and Vocational Education Examination

JUNE 2021   **ADVANCED LEVEL**

Specialty / Code	ELECTRICAL POWER SYSTEMS (EPS)
Centre N°.	
Centre Name	
Candidate Identification N°.	
Candidate Name	

Mobile phones are **NOT** allowed in the examination room
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 – 7240 Automatic Control of Electrical Machines 1**

4.   Fill in the information required in the spaces above.

5.   Fill in the information required in the spaces provided on the answer sheet using your HB pencil:
     Candidate Name, Exam Session, Subject Code and candidate identification 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.

How to answer the questions in this paper

6.   Answer **ALL** the **50** questions in this paper. All questions carry equal marks.

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. The number of parallel paths for a 4-pole wave wound D.C. machine are equal to
   - A 2
   - B 4
   - C 6
   - D 8

2. In the construction of D.C. machines, brushes are made of
   - A Copper
   - B Aluminum
   - C Carbon
   - D Brass

3. For two D.C. generators to operate in parallel, they must have the same
   - A Terminal voltage.
   - B Induced e.m.f.
   - C Speed
   - D Active power rating

4. A 3-phase 440 V, 50 Hz induction motor has 4% slip. The frequency of rotor e.m.f. will be
   - A 0.2 Hz
   - B 200 Hz
   - C 50 Hz
   - D 2 Hz

5. In which of the following motors are the stator and rotor fields rotate simultaneously?
   - A Synchronous motor
   - B Reluctance motor
   - C D.C. motor
   - D Universal motor

6. Which braking method is applicable with the help of a brake shoes?
   - A Injection of dc braking
   - B Counter current braking
   - C Electro-braking
   - D Braking by hyper synchronous operation

7. An ideal transformer is one whose
   - A Primary and secondary apparent powers are equal
   - B Primary and Secondary voltages are equal
   - C Primary and Secondary currents are equal
   - D Primary and Secondary numbers of turns are equal

8. In a three phase system, the phase sequence can be define as
   - A A 3-phase phenomenon
   - B Alternation of phases
   - C The way they attain their maximum values
   - D Is an index hour phenomenon

9. Under short circuit test condition for a transformer, the wattmeter reading gives:
   - A Total losses
   - B Referred loss
   - C Transformer losses
   - D Copper loss

10. Before removing the ammeter from a current transformer, one must;
    - A Switch off supply
    - B Use highly insulated tools
    - C Short circuit its secondary
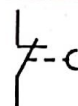   - D Seek the competence of a qualify technician

11.

Figure 1

A suitable name for symbol of figure 1 is a/an;
   - A OFF delay
   - B Timer
   - C ON delay
   - D NC delay

12. Which of the following electrical machine uses salient pole type rotor?
    - A Universal motors
    - B Compound machines
    - C Induction motors
    - D Alternator

13. The maximum number of wattmeters required to measure 3phase, 3wire balanced, unbalanced power is:
    - A 1
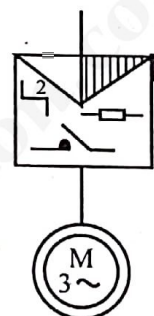   - B 2
    - C 3
    - D 2 or 3

14.

Figure 2

The functional diagram of figure 2 is that of:
   - A Two time starting
   - B Resistor starting
   - C Rotoric starting
   - D Two time statoric starting

15. Which of these motors is a two speed motor
    A Asynchronous motors
    B Induction motors
    C Dahlander motors
    D Multi-cage motors

16.

Figure 3

The diagram in figure 3 represents a
A Closed contact
B Closed contact of a limit switch
C Ruptor
D Pressure contact

17. Which of the following equation represents the mechanical characteristics of an asynchronous squirrel cage motor?
    A $\eta = f(p)$
    B $\cos\phi = f(p)$
    C $I = f(n)$
    D $T = f(n)$

18. To vary the speed of a d.c motor, we should:
    A Reduce the supply voltage
    B Vary the field flux
    C Increase its armature resistance
    D Vary the armature current

19. To choose a step by step motor the most importance quantity to take into consideration is:
    A Ambient temperature
    B Number of step per turn
    C Supply voltage
    D Mode of excitation

20. The main problem of Direct-On-Line starting of induction motor are:
    A High starting current high speed
    B High starting current high torque
    C High starting current low torque
    D Low starting current low torque

21. The three types of sequencer are
    A Magnetic, electronic and pneumatic
    B Electric, electronics and pneumatic
    C Electronic, pneumatic and aeronautic
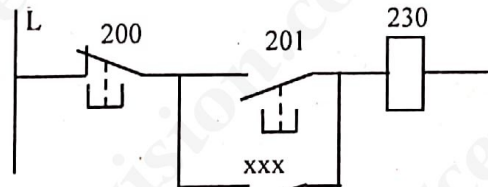   D Pneumatic, magnetic and electric

22.

Figure-4

For a TSX21 PLC the address xxx of figure 4 is
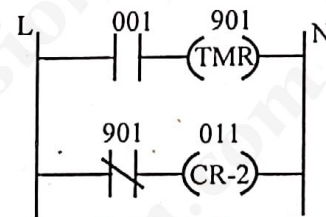A 100
B 200
C 300
D 230

23.

Figure 5

For a SLC100AB PLC the address 901 of the ladder diagram of figure 6 is that of a

A Timing delay close contact.
B Timing delay open contact
C Contactor normally closed contact
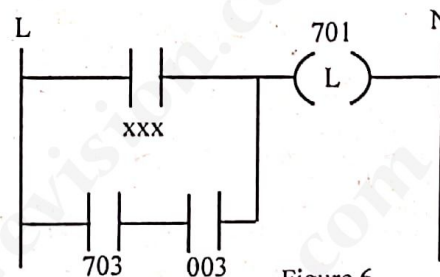D Contactor normally open contact

24.

Figure 6

If for a SLC100AB PLC the address 701 of figure 5 is that of the initial step of a GRAFCET then the address xxx is
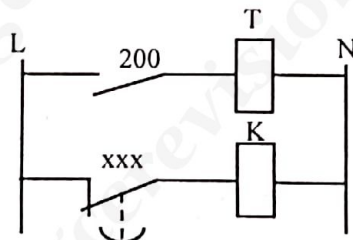A 230
B 200
C 878
D 868

25.

Figure-7

For a TSX21 PLC the address xxx of figure 6 is
A   230
B   200
C   730
D   771

26. Ladder logic programming consist primarily of
A   Virtual relay contact and coils
B   Logic gates symbols with connecting lines
C   Function block with connecting lines
D   Text-based code

27. In a PLC, the scan time refers to the amount of time in which
A   The technician enters the program
B   Timers and counters are indexed by
C   One "rung" of ladder logic takes to complete
D   The entire program take to execute

28. The RAM can perform the following possible actions EXCEPT
A   Write
B   Process
C   Erase
D   Read

29. Which of the following memory losses its content when the PLC is switch OFF.
A   ROM
B   RAM
C   EPROM
D   EEPROM

30. The following are functions of the input/output interface of a PLC EXCEPT
A   Receives information from the sensors
B   Command the pre-actuators
C   Store the information
D   Adapt the voltage level of the command unit to that of the operative part of the system

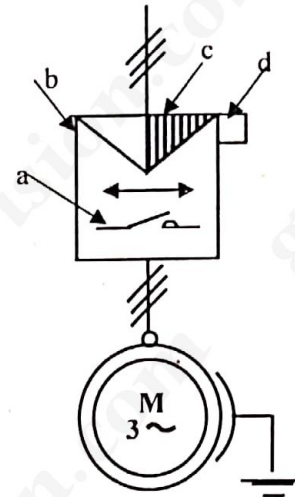**31.**

Figure 8

The letter c in figure 8 above represents
A   a contactor starter
B   a manual starter
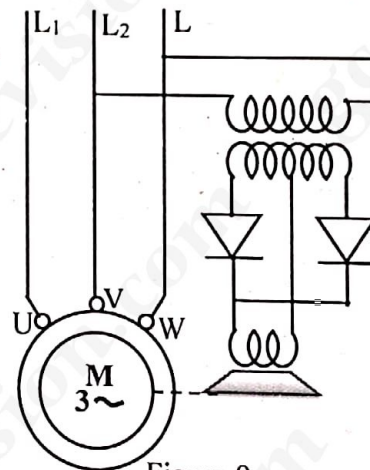C   an automatic starter
D   a semiautomatic starter

32.

Figure 9

The diagram of figure 9 is that of a
A   Direct current Electromagnetic braking
B   Direct current braking
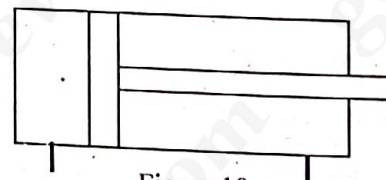C   Autotransformer starting
D   Electromagnetic starting

33.

Figure 10

The diagram of figure 10 is
A   double-acting cylinder
B   double rod cylinder
C   single-acting cylinder
D   tandem cylinder

34. The three main parts of a programmable Controllers are:
   A   CPU, Memory, Power supply
   B   Input Interface, Output Interface, Processor
   C   CPU, Processor, Memory
   D   Input Interface, CPU, Output interface

35.

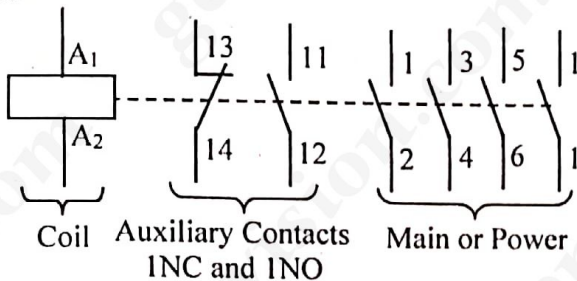Coil   Auxiliary Contacts   Main or Power
        1NC and 1NO

Figure 11:

Figure 11 shows the constitution of a contactor, The label of the power contacts of the contactors are
   A   (1,2); (3;4), and (5,6)
   B   (1,3); (2;4), and (4,6)
   C   (1,3,5,1); and (2,4,6,1)
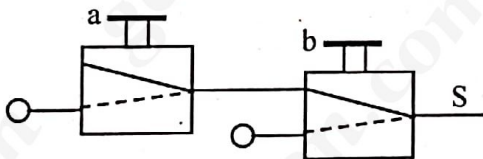   D   (1,3,5); and (2,4,6)

36.

Figure 12

In the diagram of figure 12, s is equals
   A $S = a + b$
   B $S = a\bar{b}$
   C $S = a.b$
   D $S = a + \bar{b}$

37.

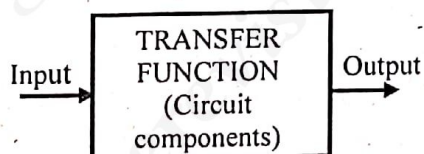
Figure 13

The diagram of figure 13 represents
   A   An open loop system
   B   A close loop system
   C   A transfer function system
   D   Input output system

38.

Figure 14

The figure 14 is the symbol of a starter of a three phase induction motor, the starter type is
   A   Automatic
   B   Semi-automatic
   C   Manual
   D   Partial

39. The protective device that protects an induction motor against overload is
   A   Fuse isolator
   B   Circuit breaker
   C   Magneto- thermal relay
   D   Thermal relay
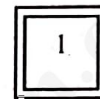
40.

Figure 15

The symbol of figure 15 of a GRAFCET represents,
   A   A double step
   B   An initial step.
   C   An end step
   D   A macro-step

41. The flow chart (GRAFCET) Level 2 is one
   A   Which contains many stages, transitions and link
   B   In which the initial stages is represented by double square
   C   Where the technological specification is given in symbolic notation
   D   Where the functional specification is given in full statements

42. Another name for the sequential function chart (SFC) is
   A   Programmable Logic Controller
   B   Industrial Programmable Automat
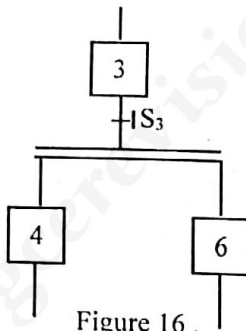   C   Flow chart
   D   GRAFCET

Turn Over

43.

Figure 16

Figure 16 shows a portion of the GRAFCET having as structure:

A   Simultaneous divergence
B   Simultaneous convergence
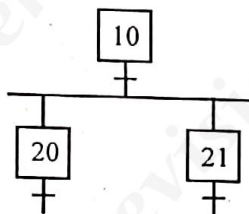C   Selective convergence
D   Selective divergence

44.

Figure 17

Figure 17 shows a portion of the GRAFCET having as structure:

A   AND Convergence
B   AND Divergence
C   OR Convergence
D   OR Divergence

45. Actions in a GRAFCET can be associated with

A   Transitions
B   Connections
C   Steps
D   Logical transition

46. Which of the following convert compressed air into mechanical energy in the form of linear movement in one direction only.

A   Piston cylinders
B   Double acting cylinders
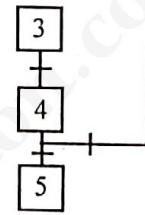C   Single acting cylinders
D   Hydraulic pumps

47.

Figure 18

According to GRAFCET rules, figure 18 is a/ an

A   Step jumping
B   Sequence repeat
C   OR divergence
D   AND divergence

48.

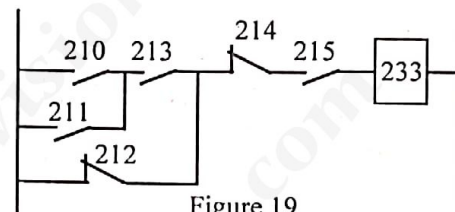Figure 19

Which of the following programmable language has been used for the codification of the diagram of figure 19?

A   SLC100
B   PB100
C   TXS 21
D   TSX 21

49.

Figure 20

The symbol of figure 20 in a ladder diagram represents

A   Normally close contact
B   Normally open contact
C   Relay
D   Contactor

50. A memory of 64kB means its capacity in bits is

A   64000bits
B   65536bits
C   524288bits
D   64bits

STOP

GO BACK AND CHECK YOUR WORK