ELC – Electrical Drawing

T002

Friday, 23/11/2018

08:30 – 11:30 AM

WORKFORCE DEVELOPMENT AUTHORITY

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ADVANCED LEVEL NATIONAL EXAMINATIONS, 2018, TECHNICAL AND PROFESSIONAL STUDIES

EXAM TITLE: ELECTRICAL DRAWING

OPTION: Electricity (ELC)

DURATION: 3 hours

INSTRUCTIONS:

The paper is composed of **the following sections**:

Section I: Eleven (11) compulsory questions.	**55 marks**
Section II: Attempt **any three (3)** out of five questions.	**30 marks**
Section III: Attempt **any one (1)** out of two questions.	**15 marks**

Note:

Every candidate is required to carefully comply with the above instructions. Penalty measures will be applied on their strict consideration

Section I. Eleven (11) compulsory questions — 55 marks

01. Draw the symbols of the following:

(i) Switched Socket outlet

(ii) Cord –operated single-pole one- way switch

(iii) Time switch

(iv) Electric Buzzer

(v) Connected conductor **(5 marks)**

02. Draw a schematic diagram of one bell controlled two push buttons located at two different places. The bell should ring by pressing any of the two buttons. **(5 marks)**

03. Draw the control circuit for the system to be used in a bus. When the conductor presses a push button, for giving signal to the driver to stop the bus, two red lamps, one facing the passengers and another on a panel facing the driver's seat will glow. The conductor should press another push button to switch off both lamps as an indication for the driver to start the bus again. **(5 marks)**

04. On labeled diagrams, show how to differentiate the power contactor from an auxiliary contactor contacts. **(5 marks)**

05. The working of one lamp controlled from two different places is summarized in the table below.

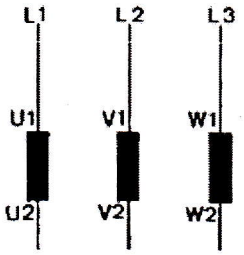
Push button S1 pressed	Push button S1 pressed	Light ON
NO	NO	NO
YES	NO	NO
NO	YES	NO
YES	YES	YES

Draw the circuit diagram according to the given information from the table above. **(5 marks)**

06. Draw a control and Power circuit for Direct on line starting of squirrel cage three-phase induction motor. **(5 marks)**

07. Draw a single line diagram for one lamp operated from three locations with the help of intermediate switch. **(5 marks)**

08. The termination of a three-phase cage motor and the terminals of a three-phase supply are shown.



a) Redraw the above and show how the motor would be in star.

b) Repeat to show how they would be connected in Delta. **(5 marks)**

09. Draw a bell indicating circuit in which an officer can call any of his four subordinates sitting at different places by pressing a common push button after adjusting a selector switch installed by the side of the push button. **(5 marks)**

10. Draw the schematic diagram using time delay relay in which two lamps, one red and one green should continue glow alternatively with a certain interval of time. **(5 marks)**

11. To achieve the phase displacement between the currents in the windings of an AC single phase motor, a capacitor is connected in series with the start winding. Draw the circuit diagram to show this arrangement. **(5 marks)**

Section II. Choose and answer any three (3) questions. 30 marks

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12. Draw a circuit to control a single phase asynchronous motor with centrifugal switch and starting capacitor **(10 marks)**

13. Draw a circuit to control a three phase asynchronous motor supplied by single phase power supply. **(10 marks)**

14. Draw a circuit to control a pole changing three phase asynchronous motor with cam switch. **(10 marks)**

15. Draw a circuit to control a DC shunt motor with field and amature reostats. **(10 marks)**

16. Draw a reversing power and control circuits of three phase wound rotor induction motor started in three steps. **(10 marks)**

Section III. Choose and answer any one (1) question. **15 marks**

17. Draw a power circuit for a three-phase induction motor squirrel cage type connected in stat-delta starting method:

a) Without showing any protection equipment.

b) With all protections equipment. **(15 marks)**

18. Draw a power circuit for three phase slip ring induction motor using rotor series resistance starter, a set of three series resistance is used.

(15 marks)

19. Describe the working operation of the dahl Ander control circuit below:

(15 marks)