

17664

21819

3 Hours / 100 Marks

Seat No.

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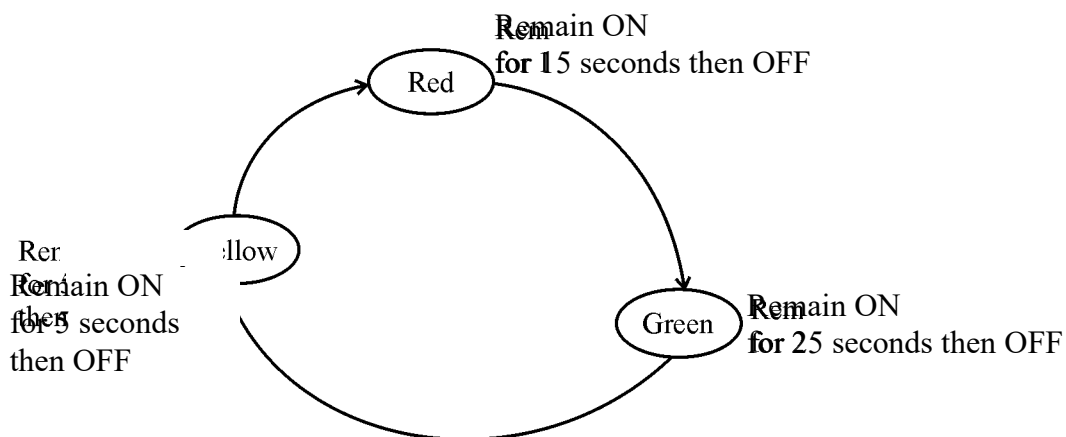
- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Assume suitable data, if necessary.
 - (5) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

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| 1. (A) Attempt any THREE : | 12 |
| (a) State the benefits of automation. (four points) | |
| (b) Draw block diagram of AC input module of PLC and explain. | |
| (c) List relay type instructions of PLC with symbols. | |
| (d) List any four I/O module selection criteria. | |
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(B) Attempt any ONE : |
6 |
| (a) Draw the block diagram of PLC and give the function of each block. | |
| (b) Draw a neat block diagram of DC input module and explain the function of each block. | |

2. Attempt any TWO :

16

- (a) (i) State types of PLC programming languages and explain.
- (ii) Give the types of miscellaneous instructions of PLC and explain.
- (b) Draw a ladder diagram for two motor operations for following conditions :
- (i) Start pushbutton starts motor M1.
- (ii) After 5 sec. motor M1 is OFF and motor M2 is ON.
- (iii) After 10 sec. motor M2 is OFF.
- (iv) Stop pushbutton stops both motors M1 and M2 if pressed any time during process.
- (c) Design traffic light control program with following conditions :
- (i) Two inputs START and STOP (Both pushbutton).
- (ii) Three outputs – Red, Green and Yellow lamps.
- (iii) Repeat the given cycle until, STOP button is pressed.



- 3. Attempt any FOUR :** **16**
- (a) State classification of PLC based on type and size.
 - (b) State the need of automation.
 - (c) Draw sinking type and sourcing type for DC input module. State the meaning of it.
 - (d) Give I/O addressing format for a typical PLC with example.
 - (e) State four precautions when placing PLC in an enclosure.
- 4. (A) Attempt any THREE :** **12**
- (a) Draw the format of ON delay timer and explain with timing waveforms.
 - (b) State the concept of redundancy in PLC with a suitable diagram.
 - (c) Draw symbol, Boolean equation, electrical and ladder diagram for AND gate.
 - (d) State the guidelines to maintain PLC in good running conditions.
- (B) Attempt any ONE :** **6**
- (a) List three input and three output devices with their symbols used with PLC.
 - (b) Explain analog input module with the help of block diagram.
- 5. Attempt any TWO :** **16**
- (a) (i) Draw a neat diagram of DC output module and give the function of each block.
 - (ii) Draw wiring diagram to connect DC motor to PLC and specify type of output module can be used.

- (b) A Railway station has 3 platforms A, B and C. One train is coming into station. The entry to this train is to be given to platform A if platform A is empty, if both platforms A and B are occupied, then it has to be given entry to platform C, if all platforms are full, then train has to wait. Design necessary ladder diagram with proper assumption and truth-table.
- (c) (i) Write PLC ladder program to measure frequency of events using timer and counter and explain it.
- (ii) Draw the ladder diagram for 4 : 1 multiplexer.

6. Attempt any FOUR :

16

- (a) Give the types of speciality I/O module and explain any two.
- (b) Write the format of Up counter and explain with waveforms.
- (c) State the necessity of grounding for PLC during installation.
- (d) List four logical instructions and also draw their formats.
- (e) Explain the procedure of troubleshooting of ladder program in PLC.
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