

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

Eighth Semester B.Tech Degree Regular Examination June 2023 (2019 Scheme)

**Course Code: EET402****Course Name: ELECTRICAL SYSTEM DESIGN AND ESTIMATION****Max. Marks: 100****Duration: 3 Hours****PART A***Answer all questions, each carries 3 marks.*

Marks

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|----|---|-----|
| 1  | Mention the scope of National Electric Code (NEC) 2011.   | (3) |
| 2  | Explain classification of voltages, its specifications, tolerances and frequencies used for domestic installations.   | (3) |
| 3  | Define the following terms.<br>i. Luminous intensity<br>ii. Luminous Flux<br>iii. Steradian   | (3) |
| 4  | Explain different laws of Illumination with help of suitable figures.   | (3) |
| 5  | Explain the working of ELCB with a neat circuit diagram.  | (3) |
| 6  | A building has a total light load of 3000W consisting of 40 light points and power load of 5000W consisting of 5 points. Determine the number of sub circuits needed in the installation. | (3) |
| 7  | Draw the single line diagram of a typical outdoor distribution transformer.   | (3) |
| 8  | How the cables and fuses are selected for a particular single phase ac motor in a small industry.   | (3) |
| 9  | Explain the following terms in connection with stand by generator<br>(i) Prime power rating<br>(ii) Continuous power rating<br>(iii) Standby power rating                                 | (3) |
| 10 | What are the advantages of Automatic power factor correction (APFC) panel?  | (3) |

**PART B***Answer any one full question from each module, each carries 14 marks.***Module I**

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|----|--|-----|
| 11 | a) Draw the standard symbols for<br>i. Circuit breaker<br>ii. 6A socket<br>iii. Electric fault | (6) |
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- iv. Spot light
  - v. Auto transformer
  - vi. Single pole switch
- b) Explain the features of the following IS codes (8)
- (i) IS732, (ii) IS3043

**OR**

- 12 a) Explain the features of electricity act 2003. (8)
- b) What are the main objectives of Electricity Regulatory Commission? (6)

**Module II**

- 13 a) What is Coefficient of utilisation. (CoU)? What are the factors affecting CoU? (8)
- b) A certain incandescent lamp, hangs from the ceiling of a room. The illuminance received on a small horizontal screen lying on a bench 2m vertically below the lamp is 63.5 lux. Calculate illuminance at a point when the screen is moved horizontally a distance of 1.5m along the bench. (6)

**OR**

- 14 a) What are the advantages and disadvantages of using LED lamps for household applications? (6)
- b) A factory area is 40m long, 20m wide and is 8m high. Point source luminaires are suspended 1.5 metres below ceiling level. The working plane is 1 metre high. Calculate the minimum number of luminaires which must be installed to conform with a recommended SHR of 1.5: 1 (8)

**Module III**

- 15 a) Explain the properties of RCBO (Residual Circuit Breaker with Overload) with its application. (4)
- b) Design and draw the Electrical Schematic (Single line Diagram) of a house wiring connected with 1 $\Phi$  KSEB supply by providing 1 $\Phi$  LT Meter (10)
- Connected Loads are: Light load: Incandescent lamps (5 Nos, 40W); Fluorescent Lamps (5 Nos, 40W); CFL (5 Nos, 20W); Ceiling Fan (4 Nos, 60W), Exhaust Fan (2 Nos, 60W), 6A plug(4 Nos, 100W), Power load: 16A Power Plug (2nos, 1000W), Water pump (1 No, 0.5HP = 373W); Water Heater (1 No, 1000W).

**OR**

- 16 a) Explain grading of Fuses with an example. (4)

- b) Design the electrical installation and draw the layout for a domestic building (10) having the following details. Also prepare an estimate of the materials. Use concealed conduit system.

i.	Drawing room	4m x 3m
ii.	Dining room	3m x 3m
iii.	Bed room	3m x 4m
iv.	Kitchen	3m x 3 m
v.	Toilet (common)	1.5m x 1.2 m
vi.	Sit out	3 m x 1.5 m

**Module IV**

- 17 a) List the Pre-commissioning test of 11kV indoor substation of a HT consumer. (4)  
b) A substation featuring 11kV/433V, 300 kVA transformer is to be installed in a densely populated area. What type of substation will you select.? Draw the single line diagram and make a list of the quantity of materials required. (10)

**OR**

- 18 a) Draw the single line diagram of a motor circuit wiring. What are the design criteria to be followed while selecting cable and circuit breaker for a motor circuit wiring? (4)  
b) A small workshop, 30m x15 m, has to be equipped with the following machinery: (10)  
(1) One 3 hp, 400V, 3phase motor  
(2) One 1/2 hp, 230V, 1 phase motor  
(3) One 1 hp, 400V, 3phase motor  
Draw the wiring diagram, estimate the quantity of materials required.

**Module V**

- 19 a) What are the design criteria to be followed while installing a standby generator? (6)  
b) Draw the block diagram representation of an off-grid and on-grid solar PV system. (8)
- OR**
- 20 a) Draw and explain the rising main panel of a five storeyed building located in a densely populated area. (4)  
b) Design an Off grid solar PV system for domestic installations with daily usage energy of 3 units. (10)

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