Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S8 (S,FE) Examinations September 2026 (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
1	Draw the standard symbols for i. Underground Cable ii. Circuit breaker iii Flood light	(3)
2	Explain the features of the code IS3646.	(3)
3	Explain Coefficient of Utilisation (CoU). List the factors affecting CoU?	(3)
4	A corridor is lighted by 4 lamps spaced 10m apart and suspended at a height of 5m above the Centre line of the floor. If each lamp gives 200 CP in all directions below the horizontal, find the illumination at the point on the floor mid-way between the second and third lamp.	(3)
5	Describe the requirement of sub circuits in electrical wiring installation.	(3)
6	Evaluate the voltage drop in 20A, 240V single phase circuit having a length of 200m. The cable used was 35 sq.mm AYFY.	(3)
7	Draw the single line diagram of a pole mounted Out Door distribution transformer.	(3)
8	List and specify the control apparatus required for a motor, 3 phase, 415V, 20HP induction motor. Draw the single line diagram of this motor circuit wiring.	(3)
9	List the advantages of Automatic power factor correction (APFC) panel?	(3)
10	With block diagram, explain the working of roof top grid interactive PV system.	(3)

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

11	a)	Explain the classification of voltage, its standard values and specification as per NEC 2011	(6)
	b)	Explain the features of Electricity Regulatory Commission Act, 1998 and Indian Electricity Act 2003.	(8)

OR

12 a) Mention the objectives of National Electric Code (NEC) 2011. (6)

b) Explain the features of the following IS codes (i) IS 732, (ii) IS 3043 (8)

Module II

13 a) Define (4)

1. Coefficient of utilization
2. Light Loss factor

b) A shop 16m x 10 m is illuminated with 200W lamps. If a CoU of 0.68 and MF of 0.75 are selected, and an illumination of 260 lux is required at the work place, calculate the number of luminaries required. Estimate the material required for installation. (10)

OR

14 a) Explain different laws of Illumination with help of suitable figures. (4)

b) A main road 2km long and 8m wide is required to be illuminated by 85W sodium vapour lamps. The lamps are mounted on poles of 10m high, so that the minimum level of illumination is 0.8 lux. Design a suitable street lighting scheme using underground cable feeders. Estimate the materials required. (10)

Module III

15 a) Enlist any three protective devices used in domestic wiring. Explain each one in detail. (6)

b) An apartment has three numbers of 3BHK (Bedroom, Hall, and Kitchen) flats. It has to be electrified independently from a common energy meter. Design the distribution boards with accessories for each flat having 8 light circuit points of 600W and 4 power circuit points of 4000W. Draw the line diagram of the electrical installation. (8)

OR

16 a) Describe the pre-commissioning tests conducted for domestic installations. (6)

b) Design the electrical installation and draw the layout for a domestic building having the following details. (8)

i. Living room - 3m x 2m
ii. Bed room - 3m x 3m
iii. Kitchen - 3m x 2.5 m
iv. Toilet - 1.5m x 1.2 m

Also prepare an estimate of the materials. Use concealed conduit system

Module IV

17 a) Explain any three pre-commissioning tests for transformers. (6)

b) In a village residential load of 10 kW, agriculture load of 20kW, and water pump of 15kW has to be electrified. Select the type of substation to be erected. Make a list of materials for installing the substation. (8)

OR

18 a) Select the cable size, starting device and fuse rating for a three phase, 415V, 15HP squirrel cage induction motor. Also draw the single line diagram. (6)

b) A small workshop 20 m x 15 m has to be equipped with the following machinery: (8)

i. One 5HP, 415V, 3phase induction motor

ii. One 1/2 HP, 230V, 1 phase motor. Draw the wiring diagram, estimate the quantity of materials required.

Module V

19 a) Explain the Installation requirements of standby generators in high rise buildings. (6)

b) Explain with the help of block diagram the working of automatic main failure system. (8)

OR

20 a) Explain the following generator ratings. (6)

i. Prime power rating

ii. Continuous power rating

iii. Standby power rating

b) Explain the design considerations of an Off grid solar PV system for domestic applications? (8)

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