Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S8 (S) (FT/PT) Examination September 2025 (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	Explain the role of IS 732 in the electrical system design.	(3)
2	Draw the standard graphical symbols as given in National Electrical Code, 2011 for (i) Star-delta starter (ii) 15A socket outlet (iii) three phase squirrel cage induction motor.	(3)
3	The illuminance received on a table, which is situated 3m vertically below a LED light is 100 Lux. Calculate the illuminance on the table when it is moved horizontally by a distance of 4m.	(3)
4	What are the advantages of LED lamps over the yesteryear luminaires?	(3)
5	Explain the operation of RCCB.	(3)
6	Discuss the significance of load survey in domestic electric system design.	(3)
7	Explain any two pre-commissioning tests for transformers.	(3)
8	How industries are classified according to their power consumption?	(3)
9	A solar PV system with a panel capacity of 1500Wp has a load requirement of 2500Wh/day. Select a suitable battery system for this PV system, which can support the above load for three consecutive days.	(3)
10	Explain the standby rating and continuous power rating of a stand by generator.	(3)

PART B

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

Module I

11	a)	Discuss the scope of National Electric Code, 2011 in design of electrical systems in India.	(7)
	b)	Explain the significance of Electricity Supply Code, 2014 with regards to electrical system installation.	(3)

c) How the voltage levels in electrical systems are classified? Explain tolerances for voltage and frequency in Indian systems. (4)

OR

12 a) Explain the relevance of IS 3043 and IS 5216. (7)

b) Explain the scope of Electricity Act 2003. (7)

Module II

13 a) A lighting scheme is to be designed for a road way having a width of 16m. The illumination required on the street is 20 lux. The luminaries are to be fitted on the poles at a height of 10m. The length of supporting arm of the pole is 2m. Assume that the lamps are placed on one side of the road. The details of the available luminaries are given below. Design the light scheme as per the requirements. (5)

Lamp type	CU	LLF	Wattage	Lumen output
HPS	0.6	0.7	100	9500
			150	16000
			250	26000
LPS	0.3	0.95	90	12500
			135	21500
			180	33000

b) Explain the importance of Light Loss Factor (LLF) in design of lighting systems. What are the different components that contribute to LLF? (9)

OR

14 a) Discuss the merits and demerits of any three luminaries commonly used for road lighting. (6)

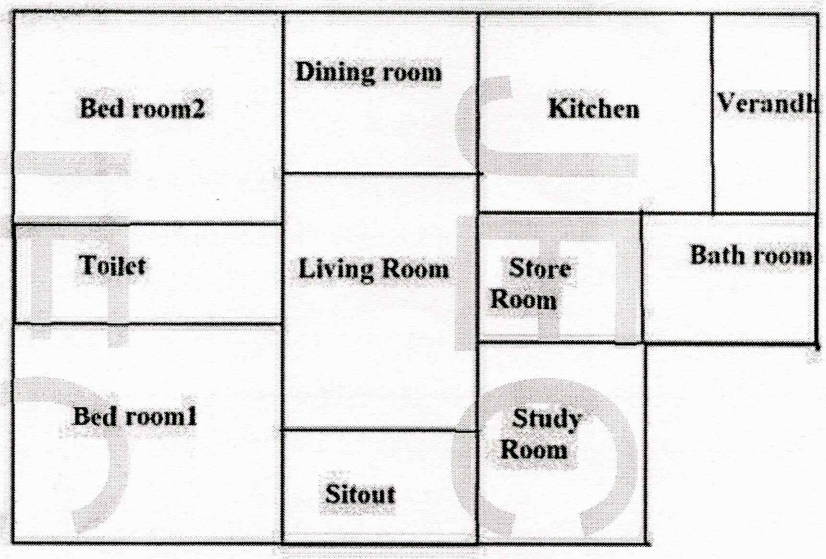
b) Explain the point by point method and average lumen method for designing the lighting systems. (8)

Module III

15 a) Explain how does an MCB protect the electrical system from over-current and short-circuit faults? (6)

b) The plan of a domestic building is shown below. Design a suitable installation for this building. Assume the loads appropriately and compute the following (i) Connected load of the building (ii) maximum demand (ii) Type of supply (8)

required (iv) Number of power and light circuits and (v) details of distribution board.



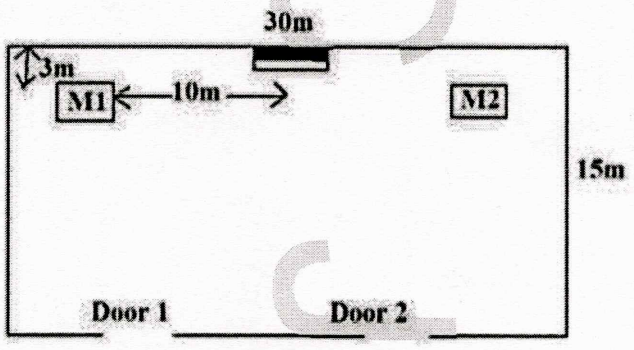
OR

16 a) Explain the importance of pre-commissioning tests in a domestic wiring system. Discuss the pre-commissioning tests for domestic installations. (8)

b) Design a suitable electrical installation for a single floor building with one bed room, one living room, one toilet, kitchen and sit-out. (6)

Module IV

17 a) The floor plan of a workshop with two induction motors is given below. Each motor has a rating of three-phase 5HP, 415V,50Hz. Design an electrical installation for this shop and draw the complete wiring diagram with properly marked ratings. (10)



b) Draw the single line diagram of a 300kVA, 11kV/415V indoor substation. Mark the system components and specify their ratings in the diagram. (4)

OR

18 a) Describe the earthing system for a substation. (6)

b) Design a substation for a connected load of 187kVA. Prepare the list of materials required. (8)

Module V

19 a) Write about the energy conservation techniques in electrical installation. (6)

b) Explain the general requirements of installation of MV Standby generator for a high-rise building. (8)

OR

20 a) Compare the grid –connected and stand-alone PV systems. (8)

b) Explain the lift system for high rise building. (6)

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