Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh semester B.Tech examinations (S), September 2020

Course Code: EE405

Course Name: Electrical System Design

Max. Marks: 100 Duration: 3 Hours

(approved data hand book may be permitted inside the examination hall)

PART A

Answer all questions, each carries 5 marks. Marks

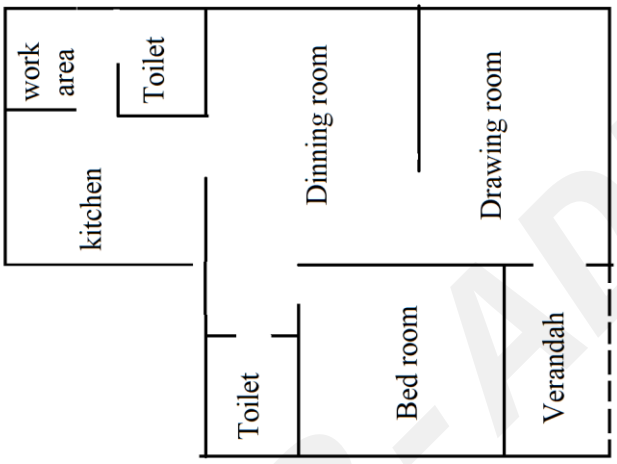
1		Explain the significance of the Electricity Act 2003.	(5)
2		How can connected load of an domestic installation be calculated as per NEC guidelines	(5)
3		Draw the single line diagram of a 250kVA, 11kV/433V indoor substation and justify the component ratings.	(5)
4		Explain the pre-commissioning tests for cables.	(5)
5		A lamp giving out 1200 lm in all directions is suspended 8 m above the working plane. Calculate the illumination at a point on the working plane 6 m away from the foot of the lamp	(5)
6		What are the design considerations of a good lighting scheme	(5)
7		Distinguish between standby power, continuous power, prime power related with standby generators	(5)
8		What are the different types of design for PV systems? Explain with the help of neat block diagram.	(5)

PART B

Answer any two full questions, each carries 10 marks.

9	a)	Describe the scope of National Electric Code 2011	(5)
	b)	Describe the selection procedure of main distribution board in domestic installations	(5)
10	a)	What are the safety aspects applicable to low and medium voltage installations in view of National Electric Code 2011	(5)
	b)	Discuss the necessity of pre-commissioning tests in an electrical installation. What the different pre-commissioning tests for the electrical installation?	(5)

11 The plan layout of a one bed room domestic building is shown below. Locate the light, fan, socket points etc., required for the electrification of the building as per NEC requirements. Calculate (a) Connected load of the building (b) Maximum demand in kW (c) Type of supply required (d) Number of light and power circuits (e) Details of the distribution board selected (10)



PART C

Answer any two full questions, each carries 10 marks.

12 a) Which are the main factors to be taken into account for the selection of cables, Explain (5)

b) Fault current anticipated in a location is 8000A. soil resistivity = 10 Ω-m. Earth resistance is limited to 1Ω. Design an earthing system. Fault duration can be taken as 3seconds. Plate electrode of 1.2m×1.2m×12.5mm shall be used. (5)

13 A 400kVA, 11kV/433V delta-star connected transformer is installed in an industry. This transformer is connected to 11kV supply through an over-head line of length 2.5 km. The conductor used is RABBIT with an equilateral spacing of 900 mm. The percentage reactance of the transformer is 4% and the full load copper loss of the transformer is 2%. The three-phase short circuit power at the utility substation is 400MVA. The resistance of the line conductor is 0.454Ω/km. Calculate peak short circuit current on the primary and secondary terminals of the transformer. (10)

14 a) Which are the pre-commissioning tests on power transformers used in an electrical installation. Explain (5)

b) An outdoor pole mounted 11kV/433 V substation has to be installed for supply to a residential area having a load of 63 kVA. With the help of a neat diagram, make a list of materials required. (5)

PART D

Answer any two full questions, each carries 10 marks.

15	a)	A corridor is lighted by 4 lamps spaced 10 m apart and suspended at a height of 5 m above the centre line of the floor. If each lamp gives 200 candle-power in all directions below the horizontal, find the illumination at the point on the floor mid-way between the second and third lamps.	(5)
	b)	Explain with the help of block diagram the working of automatic main failure system	(5)
16	a)	What is the significance of LLF in lighting design? Explain its components.	(5)
	b)	Design the lighting scheme for an area measuring 160m x 80m using high pressure sodium vapour lamps. The design requirements are illumination level = 15 lux, mounting height of pole = 10m, coefficient of utilization = 0.7, light loss factor = 0.75, with two luminaires per pole. Assume a ratio of spacing to mounting height as 4.0	(5)
17		What are the design considerations of solar PV system for domestic applications	(10)

****