Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: EE405

Course Name: ELECTRICAL SYSTEM DESIGN

Max. Marks: 100 Duration: 3 Hours

PART A

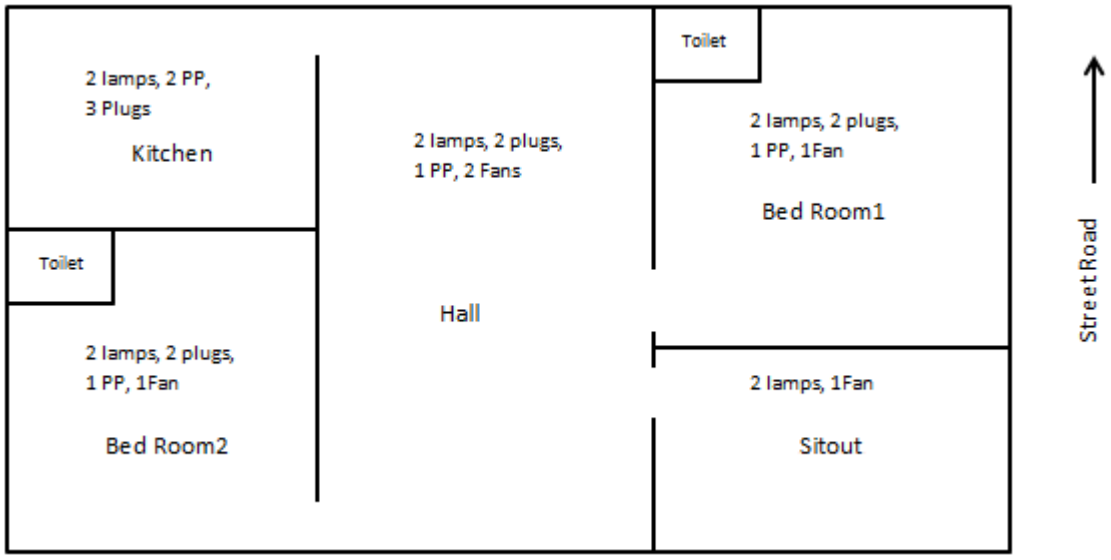
Answer all questions, each carries 5 marks. Marks

1		Mention the Scope of Indian electricity act 2003 in brief.	(5)
2		Specify a circuit breaker having both short circuit and overload protection. Explain its difference between MCB and ELCB.	(5)
3		What are the factors which decide the power distribution architecture in an electrical installation of an industry?	(5)
4		List out different types of transformer tests carried out before commissioning.	(5)
5		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.	(5)
6		Mention the various types of luminaries used for proper lighting scheme.	(5)
7		What are the various energy conservation techniques imposed in buildings?	(5)
8		Define the function of AMF panel in electrical supply system	(5)

PART B

Answer any two full questions, each carries 10 marks.

9	a)	What are the steps to be followed for safety precautions against electric shock?	(4)
	b)	Describe electric service in buildings.	(6)
10	a)	What are different protective devices used in domestic installation? Explain each one in detail.	(6)
	b)	Describe the selection procedure for ELCB for domestic and industrial dwelling.	(4)
11		Design an electrical schematic for the residential building with following details. Locate the positions of meter board, Main Switch board, DB, switch boards.	(10)



PART C

Answer any two full questions, each carries 10 marks.

12 Draw the single line diagram of a transformer substation of 400 kVA, 11 kV/ 415 V, dry type transformer. Specify the rating of each unit at the primary and secondary side of the transformer with proper justification. (10)

13 a) Design a wiring plan for installing a 40HP induction motor in an industry. (6)

b) How do you select the starter for 40HP Induction motor of 0.8pf, 80% efficiency? Explain. (4)

14 a) How do you design an earth mat in substation? Explain its importance. (5)

b) What are most common test in UG cables? Explain. (5)

PART D

Answer any two full questions, each carries 10 marks.

15 An office 30m X 15m is illuminated by twin 40w fluorescent luminaries of lumen output 5600 lumens. The lamps being mounted at a height of 3m from the work plane, the average illumination required is 240lux. Calculate the number of lamps required to be fitted in the office, assuming the CU 0.6 and maintenance factor to be 0.8. Assume the height of ceiling as 4.5m (10)

16 a) Explain rising mains and rising buses in high rise buildings. (4)

b) Explain the various design parameters taken into consideration while designing street lighting and flood lighting. (6)

17 Explain with suitable line diagram, how standby generators can include in existing electrical supply system. Assume HT consumer connection. (10)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2018

Course Code: EE405

Course Name: Electrical System Design

Max. Marks: 100 Duration: 3 Hours

PART A

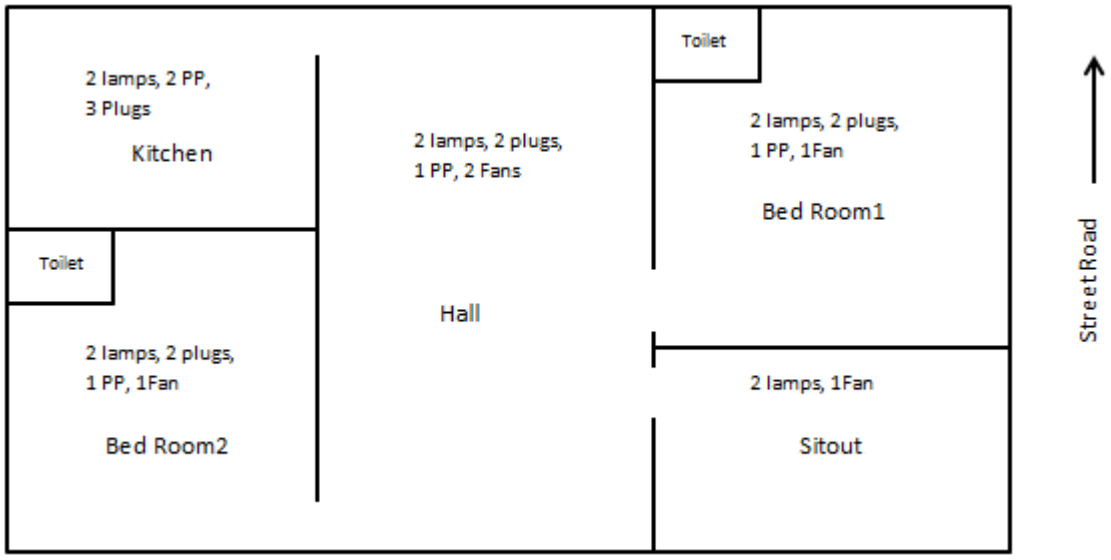
Answer all questions, each carries 5 marks. Marks

1		Why it is necessary to have pre-commissioning tests of electrical installations.	(5)
2		Specify a circuit breaker having both short circuit and overload protection. Explain its difference between MCB and ELCB.	(5)
3		Draw the single line diagram of an indoor substation showing all accessories of the system.	(5)
4		List out different types of transformer tests carried out before commissioning.	(5)
5		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.	(5)
6		Mention the features of good lighting scheme for buildings?	(5)
7		What are the various energy conservation techniques imposed in buildings?	(5)
8		Briefly explain need of a solar PV system for domestic application.	(5)

PART B

Answer any two full questions, each carries 10 marks.

9	a)	What are the steps to be followed for safety precautions against electric shock?	(4)
	b)	Describe electric service in buildings.	(6)
10	a)	What are different protective devices used in domestic installation? Explain each one in detail.	(6)
	b)	Describe the selection procedure for ELCB for domestic and industrial dwelling.	(4)
11		Design an electrical schematic for the residential building with following details. Locate the positions of meter board, Main Switch board, DB, switch boards.	(10)



PART C

Answer any two full questions, each carries 10 marks.

12 a) What are the advantages and disadvantages of an outdoor type substation over an indoor type substation? (6)

b) What are the classifications of the substations according to its functions? (4)

13 a) Design a wiring plan for installing a 75HP induction motor in an industry. (6)

b) How do you select the starter for the above Induction motor of 0.8pf, 75% efficiency? Explain. (4)

14 a) How do you design an earth mat in substation? Explain its importance. (5)

b) What are most common test in UG cables? Explain. (5)

PART D

Answer any two full questions, each carries 10 marks.

15 a) What is energy conservation techniques imposed in buildings? Mention its necessity. (5)

b) Distinguish between continuous power, prime power and standby power related with standby generator. (5)

16 a) Explain rising mains and rising buses in high rise buildings. (4)

b) Explain the various design parameters taken into consideration while designing street lighting and flood lighting. (6)

17 a) Explain with suitable line diagram, how standby generators can include in existing electrical supply system. Assume HT consumer connection. (6)

b) Write short notes on generator installation and its protection. (4)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 2019

Course Code: EE405

Course Name: Electrical System Design

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks. Marks

1		What are the importance of IS 3043, IS 732?	(5)
2		Why it is necessary to have pre-commissioning tests of electrical installations.	(5)
3		Draw the single line diagram of an indoor substation showing all accessories of the system.	(5)
4		What is polarity test of a transformer? Why it is important.	(5)
5		What are the requirements of efficient street lighting**?**	(5)
6		Mention the features of good lighting scheme for buildings?	(5)
7		What are the factors to be considered while selecting a standby generator?	(5)
8		Briefly explain need of a solar PV system for domestic application.	(5)

PART B

Answer any two full questions, each carries 10 marks.

9	a)	What are the safety aspects that have to be considered while doing electrical dwelling in LV and MV installations?	(6)
	b)	What is NEC? Explain its relevance in electrical installations.	(4)
10		In a residential building, having 45 nos of light points , 10 fan points, 20 nos of 5 ampere plug socket, 6 nos of 15 ampere power plug socket and 1.5 HP single phase motor pump set (assume DOL starting). Calculate the total connected load, the no. of sub-circuits required, and select the conductors used for each sub-circuits.	(10)
11		A three occupant building has to be electrified independently from a common energy meter. Design the distribution boards with accessories for each resident having 10nos of light circuits, 6 nos of power circuits.	(10)

PART C

Answer any two full questions, each carries 10 marks.

12	a)	What are the advantages and disadvantages of an outdoor type substation over an indoor type substation?	(6)
	b)	What are the classifications of the substations according to its functions?	(4)
13	a)	What is the difference between LT and HT Motor? Explain with example.	(4)
	b)	Calculate the load current and cable size of 20HP motor of 415V, 50Hz, supply with 80% efficiency.	(6)

14	a)	Draw the single line diagram of pole mounted outdoor substation of 11kV/415V, 250kVA transformer showing all necessary parts based on loading.	(7)
	b)	What will the full load current for the above scheme?	(3)

PART D

Answer any two full questions, each carries 10 marks.

15		A shop 16m x 10m is illuminated with 200w incandescent lamps. If a CU of 0.8 and an MF of 0.75 are selected, and an illumination of 260lux is required at the work place, calculate the number of luminaires required. Take the mounting height as 2m.	(10)
16	a)	What is energy conservation techniques imposed in buildings? Mention its necessity.	(4)
	b)	Distinguish between continuous power, prime power and standby power related with standby generator.	(6)
17	a)	Write short notes on generator installation and its protection.	(5)
	b)	Explain design requirements of high rise buildings.	(5)

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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

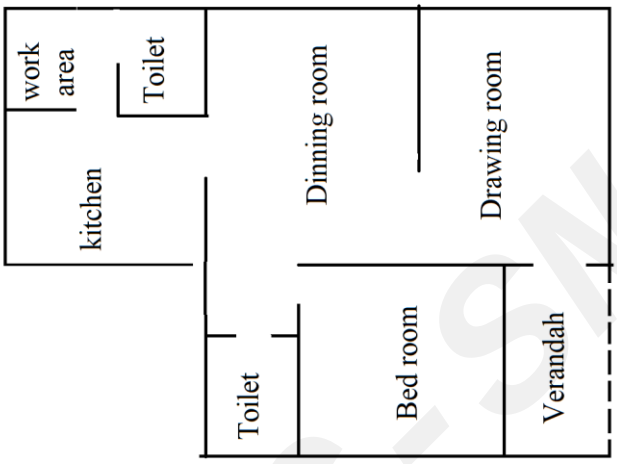
1		Explain the significance of the Electricity Act 2003.	(5)
2		How can connected load of an domestic installation be calculated as per NEC guidelines	(5)
3		Draw the single line diagram of a 250kVA, 11kV/433V indoor substation and justify the component ratings.	(5)
4		Explain the pre-commissioning tests 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)

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Reg No.:_____ **00000EE405121903** Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh Semester B.Tech Degree Examination (Regular and Supplementary), December 2020

Course Code: EE405
Course Name: Electrical System Design

Max. Marks: 100 Duration: 3 Hours

PART A
Answer all questions, each carries 5 marks. Marks

1		Explain the scope of the following IS codes: IS 732, IS 3043	(5)
2		What are the factors to be considered while selecting the type of wiring?	(5)
3		What is meant by selective coordination in electrical distribution system?	(5)
4		What is the purpose of earthing in an electrical installation? Distinguish between system earthing and equipment earthing.	(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		Discuss the significance of LLF and its components.	(5)
7		Which are the energy conservation techniques in lighting?	(5)
8		What is automatic transfer switch? Explain.	(5)

PART B
Answer any two full questions, each carries 10 marks.

9	a)	Explain the salient features of electricity act 2003.	(5)
	b)	Describe electric services in buildings.	(5)
10	a)	A single storied residential building with two bedrooms with attached toilets, one dining room, one living room, kitchen, and sit out. Decide the required number of light points, fan points, 5A socket outlet, 15A socket outlet. Decide the number of sub circuits required. Determine the connected load, type of supply required, sub circuits required, maximum demand.	(10)
11	a)	What are the special features in the electrical installation for a high-rise building than a domestic installation?	(5)
	b)	Which are the pre-commissioning tests on a domestic installation?	(5)

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

b) An industrial electrical installation has a demand of 50 kW at a power factor of 0.75 lagging. Determine the rating of the capacitor bank required to improve the power factor to 0.95 lagging. (5)

14 a) 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)

b) Explain the substation earthing system. (5)

PART D

Answer any two full questions, each carries 10 marks.

15 a) What are the laws of illumination? Explain with a neat diagram. (5)

b) 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)

16 a Explain with the help of block diagram the working of automatic main failure system. (5)

b Explain with the help of schematic, the necessary protections to be provided for a 100 kVA standby diesel generator installed in an electrical installation. (5)

17 What are the design considerations of solar PV system for domestic applications? (10)

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