Reg. No.										

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

II SEMESTER M.TECH (EMAL / PESC) END SEMESTER EXAMINATIONS, MAY 2016

SUBJECT: LIGHTING CONTROLS: TECHNOLOGY & APPLICATIONS [ELE 534]

(PROGRAM ELECTIVE – II)

REVISED CREDIT SYSTEM

Time: 3 Hours 14 MAY 2016 MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data may be suitably assumed.

1A. With an example explain the relation between changes in light output and perception of light by human eye ? ***(02)***

1B. Suggest control devices, device location (with wiring diagram), recommended features & settings, and design considerations for the classroom shown in Fig1 with the following control strategies.

a) Daylight

b) Occupancy responsive + Manual dimmer.

Justify your suggestions. ***(08)***

2A. State and Describe the following performance characteristics as applicable to ballast design.

a) Ballast Factor (BF)

b) Ballast Efficacy Factor (BEF)

c) Lamp Current Crest Factor (CCF).

Draw an electrical setup used for testing of above mentioned performance characteristics of ballast. ***(06)***

2B. Explain the importance of following characteristics of ceiling mounted PIR occupancy sensor for interior lighting applications.

a) Field of view.

b) Time delay. ***(04)***

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3A. Mention the eight standard points used to improve the lighting quality in a new interior lighting system as per LEED v4 standards? ***(08)***

3B. Explain the challenges of operation of AC LEDs. ***(02)***

4A. Explain in detail the three KNX TP topologies, KNX PL topology, KNX IP topology and RF topology with block diagrams. ***(04)***

4B. Discuss about the ACN protocol stack with detailed explanation of protocol layers. ***(03)***

4C. With the help of network discovery sequence diagram explain how ZigBee network join is taking place? ***(03)***

5A. Discuss the OSI layer model with functions of each layer. ***(04)***

5B. Briefly explain the blocks present in neuron chip of LON device and its significance. ***(02)***

5C. Discuss in detail about the three major parts of BACnet , used to achieve interoperability. ***(04)***

6A. Draw the block diagram of a general integrated closed-loop control of blind and electric lights. With a case study explain the application of any wireless communication protocol for lighting control system. Compare the structure of the wireless standard mentioned with the structure of Enocean sensor node. ***(05)***

6B. Explain the packet format of DMX512 with data stream diagram. With diagram show how it can be used for theatrical applications. ***(03)***

6C. Compare the wireless standards Bluetooth , ZigBee and Wifi with respect to the following parameters : Range, Raw data rate, Interference avoidance method and Maximum number of nodes per network ***(02)***

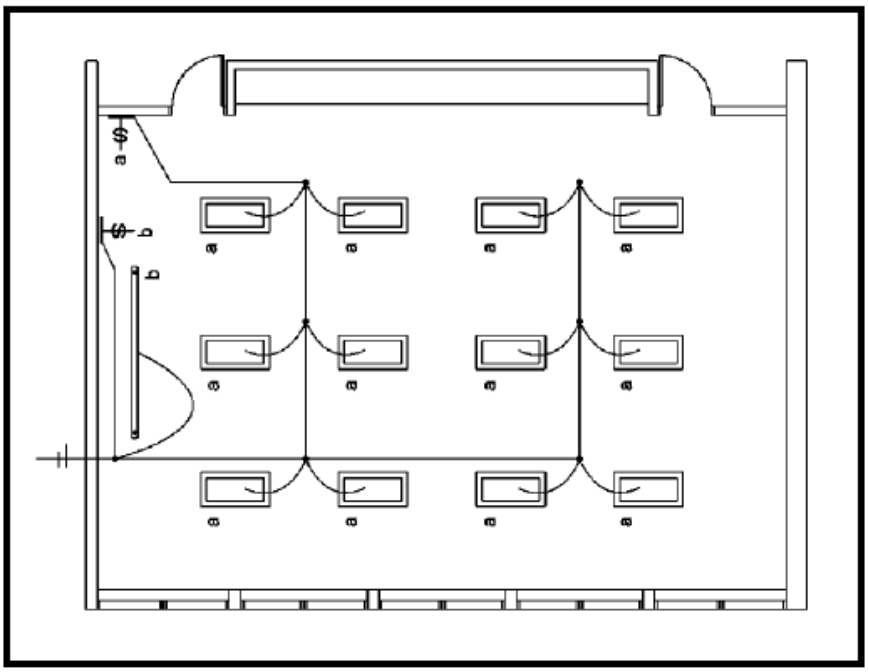

Fig1: Conventional wiring (Top view)