TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING
Faculty of Engineering and Technology in Conjunction with Kenya Institute of Highways & Building Technology **(KIHBT)**

HIGHER DIPLOMA IN TECHNOLOGY
ELECTRICAL POWER ENGINEERING

EEE 3207: ELECTRICAL BUILDING SREVICES ENGINEERING

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2016

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

1. You should have the following for this examination
   - Answer booklet
   - Electronic calculator
   - Student ID
   - Examination pass
2. This paper consists of **FIVE** questions.
3. Answer **ANY THREE** questions.
4. All questions carry equal marks.
5. **Do not write on the question paper**
   This paper consists of **THREE** printed pages

PAPER TWO

QUESTION ONE

1. Define the following terminologies;
   i. Waste light factor
   ii. Coefficient of utilization
   iii. Reflection factor
   iv. Maintenance factor (8mks)
2. Discuss why waste light factor is used in flood light calculations for total flux in a building. (3mks)
3. A laboratory measuring 25m long by 6m wide is to be illuminated to a level of 250 lumens/m^2. Assuming of average lumen output efficiency of a lamp is 40 lumen/watt the maintenance factor is 0.8, and the utilization factor is 0.5. Calculate the total lamp power and the number of lamps if 60w fluorescent lamps are used. (9mks)

QUESTION TWO

1. Define the following terminologies
   i. Design current
   ii. Fusing current
   iii. Current carrying capacity
   iv. Close excess current protection
   v. Discrimination (10mks)
2. A 240V, single phase, 15KW load operates at an power factor of 0.7 lagging and is fed from a distribution board 20m away by a 2-core PVC insulated and armored cable with aluminum conductors. The cable is clipped direct to a cable tray. The ambient temperature is 45^0C and close excess current protection is provided by HRC fuse.
   Determine fusing the correction factors the tables of current rating and voltage drops provided in table 9k3 and 9B1 attached, the most economical size of conductor for the cable for this load. (10mks)

QUESTION THREE

1. State;
   i. The steps required by a team conducting a consensus estimating session to obtain a good estimate for an engineering contract (4mks)
   ii. Four site preliminaries in a construction project (2mks)
2. Define;
   i. Tendering
   ii. Estimating
   iii. Estimate assumptions (6mks)

3. Describe the procedure for measuring work on site to assess percentage completion of a project. (4mks)
4. Explain why it is necessary to clarify ambiguities and uncertainties at the site before tendering for a construction project. (4mks)

QUESTION FOUR

1. State;
   i. Four considerations that determine the requirements for lighting protection in a building. (4mks)
   ii. Effects of a lighting stroke (2mks)
2. Explain the following in reference to lighting protection
   i. Air terminations
   ii. Earth terminations
   iii. Down conductors
   iv. Equi-potential bonding (8mks)
3. Explain in reference to lighting protection
   i. Roof conductors
   ii. A zone of protection for a surge arrestor
   iii. Reason for overlapping zones of protection in a building (6mks)

QUESTION FIVE

1. Describe the activities of the client in contract management at;-
   i. Pre-tender stage
   ii. Post tender stage (4mks)
2. State;
   i. Sources of prime cost in project estimation for an engineering project
   ii. Three types of tendering and their advantages (4mks)
3. Explain two possible remedies for a breach of contract (4mks)
4. Explain any four circumstances under which a valid contract may be rendered void (6mks)
5. Define tender appraisal (2mks)