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**University Examinations 2014/2015**

SECOND YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR DIPLOMA IN ELECTRICAL ENGINEERING

**EEE 0221: ELECTRICAL ENGINEERING PRINCIPLES III**

**DATE: OCTOBER 2015 TIME: 11/2 HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two*** *questions*

**QUESTION ONE (30 MARKS)**

1. Define the following as applied to illumination:
2. Steradian. (1 Mark)
3. Lumen. (1 Mark)
4. Explain briefly the meaning of the term glare. (1 Mark)
5. The efficiency of a certain lamp is stated to be 20 lumen per walt.
6. What does this mean? (1 Mark)
7. What is the MSCP of the lamp if its intake is 120 watts? (3 Marks)
8. State four factors which affect the coefficient of utilization. (4 Marks)
9. Differentiate between specular and diffuse reflection. (2 Marks)
10. A staircase is lighted by 4 metre of tubular lamps arranged in a continous line and placed along the top of the case. Determine the illumination produced on a horizontal surface 1 metre below the lamps in a position directly underneath the centre of the 4m length of the lamps on the assumption that the tubular lamp emit 1880 luments per metre run. Neglect the effect of reflector used. (4 Marks)
11. Define a transformer. (1 Mark)
12. Explain briefly the working principle of a basic transformer. (4 Marks)
13. Explain why a transformer should never be operated on dc supply. (2 Marks)
14. A 100 KVA, 3000/200V, 50HZ single phase transformer has 120 hms on the secondary. Calculate:
15. The approximate value of primary current. (1 Mark)
16. The approximate value of secondary current. (1 Mark)
17. The approximate value of primary turns. (2 Marks)
18. The maximum value of flux. (2 Marks)

**QUESTION TWO (15 MARKS)**

1. State three properties of a well-designed lighting scheme. (3 Marks)
2. A light source having an intensity of 400 candle power in all directions is fitted with a reflector so that it directs 85% of its light along a beam having a divergence of 150.
3. What is the total light flux emitted along the bean. (3 Marks)
4. What will be the average illumination produced on a surface normal to the beam direction at a distance of 6m. (3 Marks)
5. Estimated the number and wattage of lamps which would be required to illuminate a workshop space 80mX25m by means of lamps mounted 5m above the working plane. The average illumination required 105 lux. Take:

Coefficient of utilization = 0.4

Depreciation factor =0.8

Luminous efficiency =28/m/w

Assume a spacing/height ratio of unity (6 Marks)

**QUESTION THREE (15 MARKS)**

1. Define the term regulation of a transformer. (1 Mark)
2. A 200KVA, 6600/400V single phase transformer has a secondary terminal voltage of 358.2v. Determine the regulation of the transformer. (2 Marks)
3. A transformer take a current of 0.8A when its primary is connected to a 240V, 50HZ supply, the secondary being on open circuit. If power absorbed is 108 walts, determine:
4. The iron loss current. (2 Marks)
5. The power factor on no-load. (2 Marks)
6. The magnetizing current. (2 Marks)
7. A single phase transformer with a ratio of 440/110V takes no-load current of 5A at 0.2 power factor lagging. If the secondary supplies a current of 130A at a power factor of 0.8 lagging, estimate the current taken by the primary. (6 Marks)

**QUESTION FOUR (15 MARKS)**

A 200 KVA transformer has a primary winding resistance of  and a secondary winding resistance of 0.001. The iron loss is 2.5 KW and the primary and secondary voltages are 4 KV and 320 V respectively. If the power factor of the load is 0.8, determine the efficiency of the transformer.

1. On full load. (8 Marks)
2. On half load. (7 Marks)