17639

15116

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) Attempt any THREE of the following : **12**

(i) Enlist any four features of good illumination scheme.

(ii) State any two advantages and two disadvantages of CFL lamps.

(iii) Draw and explain the circuit for single lamp controlled by two switches.

(iv) State the meaning of polar curve and give two applications of it.

Marks

b) Attempt any ONE of the following : **6**

(i) With the help of labelled diagram, explain construction and working of sodium vapour lamp.

(ii) Define the following terms related to laws of illumination.

(1) M.H.C.P.

(2) M.S.C.P.

(3) M.H.S.C.P.

2. Attempt any TWO of the following : **16**

a) State the purpose of lighting control. List different types of dimmer. Explain any two dimmers in detail with suitable diagrams.

b) An indoor badminton court is accommodated in a hall of 20 m length; 10 m width; and 15 m height. The walls and ceiling of hall are painted black and do not reflect any light. Design a scheme for providing an average illumination of 80 lux at ground surface, using 200 W tungsten filament lamps with suitable fitting. Give reason for your choice. Take coefficient of utilization = 0.5, efficiency of lamps = 15 lumens/watt.

c) A building 50 m × 15 m is to be illuminated by flood light projectors situated 25 m away. If illumination is 100 lux; coefficient of utilization 0.5, depreciation factor 1.5 and waste light factor 1.2 Estimate the numbers, size and angle of the projectors assuming 1000 watts lamps having 17 lumens / watt luminous efficiency.

Marks

3. Attempt any FOUR of the following : **16**

a) State the specific requirements for –

(i) Factory lighting

(ii) Sports lighting

b) State and explain the design of street light installation principles.

c) A 250 V lamp has a total flux of 1500 lumens and takes a current of 0.4 A. Calculate

(i) Lumen per watt

(ii) M.S.C.P. per watt

d) Describe semi-direct and semi-indirect scheme for illumination.

e) Explain single lamp control by three point method and four point method.

4. a) Attempt any THREE of the following : **12**

(i) State general illumination level in lux as per Indian standards for following places at a sports complex.

(1) Badminton court

(2) Carrom Hall

(3) Table Tennis Hall

(4) Basket Ball Court

(ii) Explain the stepwise procedure for designing illumination scheme for commercial unit.

(iii) State which type of lamps are used for decorative lighting and why.

(iv) A small assembly shop 16 m long; 10 m wide and 3 m up to trusses is to be illuminated to a level of 200 lux. The utilization and maintenance factors are 0.74 and 0.8 respectively. Calculate number of lamps required to illuminate whole area if the lumen output of the lamp selected is 3000 lumens.

Marks

b) Attempt any ONE of the following : **6**

(i) Distinguish between incandescent lamp and flourescent lamp on the basis of following –

(1) Lumen output

(2) Luminous efficiency

(3) Initial cost

(4) Brightness

(5) Voltage Regulation

(6) Energy saving

(ii) Which type of lamps should be selected for following applications ?

(1) Aquariums

(2) Stage lighting

(3) Flood lighting

(4) Advertisement

(5) Factory lighting

(6) Street lighting

5. Attempt any TWO of the following : **16**

a) State illumination level in lux as per I.S. for residential purposes in following places –

(i) Living Room

(ii) Bedroom

(iii) Kitchen

(iv) Stairs

(v) Dining Room

(vi) Dressing table

(vii) Bathroom mirror

(viii) Study table

b) State and explain the general factors to be considered while designing the lighting scheme for outdoor application.

c) State and explain general requirement for illumination of Health care centres and hospitals.

Marks

6. Attempt any FOUR of the following : **16**

a) Define the following terms related to flood lighting –

(i) Coefficient of utilisation

(ii) Depreciation factor

(iii) Space to height ratio

(iv) Reflection factor

b) State the fundamental lighting criteria which is to be considered while designing railway platform lighting installations from following two points of view –

(i) Types of lamp

(ii) Types of luminaire

c) Explain the effect of variation of supply voltage on the performance of CFL as regards current, lumen output, efficiency and life.

d) State the lighting schemes to be preferred for agricultural and horticultural applications and why.

e) State the criteria for preferring tungsten filament lamp on operation table in hospital.

———