

Certified Lighting Efficiency Professional Instructions & Application

CLEP Exam Remote Testing Center Version

Note: If applicant is taking the certification exam with a live seminar, they should use the Live Seminar CLEP Application. Applicants must submit a separate registration for the associated training seminar with this program (live or online).

The following information is contained in this booklet:

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Part A: Information for Applicants

CERTIFIED LIGHTING EFFICIENCY PROFESSIONAL (CLEP®)

Please read thru the following important information before submitting your **CLEP® Application found in part B** of this booklet.

1. CLEP® OBJECTIVES

- To raise the professional standards of those engaged in lighting efficiency management.
- To improve the practice and quality of lighting efficiency projects by encouraging professionals in a continuing education program of professional development.
- To identify persons with acceptable knowledge of the principles and practices of lighting efficiency/management through completing an examination and fulfilling prescribed standards of performance and conduct.
- To award special recognition to those lighting professionals who have demonstrated a high level of competence and ethical fitness for lighting management.

2. ELIGIBILITY

Professionals with the following prerequisite may apply:

- A four-year **engineering or architect degree, and/or P.E., and/or R.A., and/or CEM** with at least *three* years experience in lighting efficiency.

OR

- A four-year degree in business or related degree with at least five years experience in lighting efficiency.

OR

- A two-year technical degree with eight years experience in lighting efficiency.

OR

- Ten years or more verified experience in lighting efficiency.

3. THE REQUIRED BODY OF KNOWLEDGE

The effective practice of lighting efficiency requires in-depth knowledge of a wide variety of subjects. For certification purposes, however, the candidate need only demonstrate to the satisfaction of the Certification Board the knowledge and ability to apply the essentials of lighting management.

4. PROCEDURES

The first step in the CLEP application process is to complete the exam application. The application may be typed or completed by hand. Since certification is based on education, experience and passing the examination, it is important that the applicant understands the eligibility requirements (section two), and has attained the prerequisite to qualify for certification.

There are two ways to meet the application deadline:

- The application must be received six weeks prior to the CLEP exam if the applicant feels confident he/she has the necessary prerequisite for certification.
- Should an applicant have questions about the prerequisite for certification, he/she can have his/her application reviewed by the CLEP Board prior to taking the exam. A completed application (including official college transcripts, employment verification and all references) must be received at least three months prior to desired exam date, and the applicant must request in writing that he/she would like his/her application reviewed by the CLEP Board. The CLEP Board must have a clear understanding of the applicant's lighting experience. Therefore, it is very important that all applicants give clear, complete details.

NOTE: Please arrange for official college transcripts to be forwarded to AEE. Also, if you are self-employed, or principal owner of a company, three client verifications are required in place of employment verification.

NOTE – CLEP Exam Held At Remote Testing Center

Your CLEP Exam Application must be approved by AEE prior to sitting for the exam. You will receive a letter once AEE has approved your application. You will then be contacted by the testing center to coordinate with you the date, time, and location of your exam. Please do not contact the testing center directly (Contact AEE Certification Staff if you have a question).

For a listing of Remote Testing Centers (ACT Testing Centers):

<http://www.act.org/actcenters/locate/index.html>

For a listing of Real-time Online Seminars (Including Lighting):

www.aeecenter.org/realtime

Once the application is complete and exam is passed, all applications are sent to the CEM Board for final approval. Only after this approval is certification granted.

5. THE APPLICATION

The CLEP application provides an organized method for documenting professional and educational background, achievements and community service.

The personal data form is divided into the following three parts:

- Division I – Education
- Division II – Professional Registration
- Division III – Experience and Activities

A maximum of 350 points each can be earned in Division I and II and 700 points for Division III. The total maximum score that can be credited on the application form is 1400. The applicant is requested to list on the application form all pertinent information in these categories for evaluation by the CLEP Board.

The two areas of evaluation shall receive points as follows:

- Application Form 1400 points maximum
- CLEP Examination 1000 points maximum

To be awarded the CLEP designation, candidates must achieve the minimum total of 1400 points with a minimum of 700 points earned from the CLEP Application and the minimum of 700 points earned from the CLEP examination.

If a candidate has failed to acquire sufficient points recommended for CLEP, the candidate may be re-examined at a subsequent examination period and/or resubmit an updated application form. Examination scores will be kept on file by the Certification Director for a period of three years. A score can be resubmitted if the candidate so requests.

It is essential that candidates devote considerable time and effort to completing the application form since judgment by the Certification Board can be based only on the information provided. Inaccurate and/or incomplete data will only be a liability for the applicant. Documentation should be attached to the application to substantiate the information presented.

6. THE CLEP EXAMINATION

The applicant must complete a four-hour exam. Approved Remote Testing Locations are available at: For a listing of Remote Testing Centers (ACT Testing Centers): Visit <http://www.act.org/actcenters/locate/index.html>

Dates and locations of live seminars and live exam option locations are determined by the CLEP Board. If an applicant wishes to take the exam with a live seminar instead of a testing center, they must notify the CLEP administrator. The CLEP examination questions are based on concepts and experiences basic to lighting management, recognized tests, and supplemental reading. **The exam is OPEN BOOK!** The types of questions presented are multiple choice. Grading is accomplished by members of the CLEP Board or its designee and the Certification Director. Examinations are identified by number rather than by the candidate's name to assure confidentiality and objectivity in grading.

The written CLEP Examination deals with such subjects as:

- **Codes and Standards**
- **Lighting Evaluation and Economics**
- **Lighting Controls**
- **Lighting System Maintenance**
- **Quantity and Quality of Illumination**
- **Environmental Safety**
- **DSM and Lighting Efficiency**
- **Lighting Fundamentals**
- **Design Basics**
- **Lamps and Ballasts**

7. MAINTAINING CERTIFICATION

The continued education of lighting professionals is essential to enable them to cope with rapidly changing conditions. Therefore, to remain certified, a Lighting Efficiency Professional must accumulate eight professional credits every three years and submit a completed recertification form to the Certification Director. Each CLEP reaches recertification date on the fourth January 1st following the date appearing on the certificate attesting to certification.

Professional credits for recertification can be accumulated any time from the date receiving certification to the October immediately preceding recertification date. For example, Lighting Professionals certified by examination and receiving a certification in 2008, file a record of eight professional points with the certification director by October 31, 2008. These professionals all reach recertification on January 1, 2009.

Activities for CLEP Credits

- Continued employment in lighting activities:
4 credits for 3 years
- Membership in a professional engineering society:
3 credits
- Continuing education/professional activities (this includes in-house seminars involving lighting):
2 credits per CEU, college credits hour or 10 contract hours for seminars
- Awards presented and/or papers published involving lighting:
2 credits each
- Offices held in a professional engineering society:
1 credit per year

8. LIFETIME CERTIFICATION

A CLEP upon retiring and reaching the age of sixty-two is certified for life. No further reporting is necessary except to notify the certification director of meeting the age requirement by sending a copy of driver's license.

9. SUSPENSION OF REVOCATION OF CERTIFICATION

If a Lighting Professional does not accumulate the required professional credits, certification shall terminate, unless in the judgment of the Certification Board, extenuating circumstances exist and deficiency can be readily overcome.

Certification may be revoked for failure to abide by the AEE Code of Ethics. The Lighting Professional is offered a hearing by the certification board and notified of the views of the complainant and of the hearing date and location. This notice shall be given in writing at least thirty days in advance of the hearing.

10. REINSTATEMENT OF CLEP

Lighting Professionals who do not acquire sufficient CLEP maintenance points to be recertified on recertification date will be notified in writing of suspension from using the CLEP designation and will no longer be listed as a CLEP in any AEE publication until such time that the Lighting Professional:

- Resubmits to the certification process and successfully meets the criteria for certification by personal data information and examination;

OR

- Acquires make-up points at a cumulative total equal to 3 ½ per year for every year since original date of certification.

11. CLEP EXAM FEES:

Option A: CLEP Exam at Remote Testing Center

APPLICATION FEES (Remote Testing Center Application Only)

A fee of \$400.00 dollars is payable with the filing of the application. This includes the CLEP application (\$200.00) and first-time CLEP examination fee (\$200.00). *No application or examination fee refunds are allowed.*
 Re-Examination Fee (Remote Testing Center Location): For each re-examination, a fee of \$150.00 will be required.

Option B: CLEP Exam held with Live Seminar

APPLICATION FEE (CLEP Exam held with Live Seminar)

A fee of \$300.00 dollars is payable with the filing of the application. This includes the CLEP application (\$150.00) and first-time CLEP examination fee (\$150.00). *No application or examination fee refunds are allowed.*
 Re-Examination Fee: For each re-examination (held with live seminar), a fee of \$100.00 (new rate effective 01/01/09) will be required.

RENEWAL FEE

For each three-year renewal, the fee will be \$300.00 / Reinstatement fee is \$350.00. *No refunds allowed.*

12. USE OF CLEP DESIGNATION

As a Certified Lighting Efficiency Professional (CLEP®), the Lighting Efficiency Professional may use the designation with his/her name on organization letterheads, business cards, certain internet listings and forms of address. Certification is for individuals only. The CLEP designation may not be used to imply that an organization, company or firm is certified. AEE does not endorse or recommend any individual CLEP, product or service. Improper usage of CLEP or AEE logo may result in suspension. If you have questions about usage of the CLEP designation, please contact AEE.

Sample Correct Usage (Signature / Business Card):

John A. Smith, P.E., CLEP / Mary Jones, CLEP, CEM

Web Usage:

John A. Smith is an individual member of the Association of Energy Engineers ([AEE](#)) and is a [Certified Lighting Efficiency Professional \(CLEP\)](#)

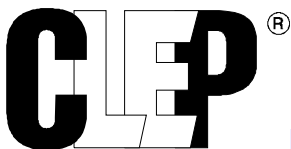
Incorrect Usage:

ABC Company is Certified by AEE.

Correct Usage:

- ABC Company has many Certified Lighting Efficiency Professional -CLEPs® on its staff.
- ABC Company is looking for a Certified Lighting Efficiency Professional with experience for a position.
- John Smith, President of ABC Company, is an individual member of the Association of Energy Engineers and is a Certified Energy Manager (CEM), Certified Carbon Reduction Professional (CRM) and Certified Lighting Efficiency Professional (CLEP).
- ABC Company is a Corporate Member of the Association of Energy Engineers (AEE) and has five current Certified Lighting Efficiency Professional (CLEP) on staff including.....

John Smith is an individual:



Link to www.aeecenter.org/certification

Corporate Member of:



www.aeecenter.org Link to www.aeecenter.org

Applicant downloads and completes CLEP application including CLEP Seminar info



Applicant sends completed CLEP application to AEE for review



AEE Reviews - sends initial letter to applicant either accepting or requesting additional info



Upon initial acceptance, AEE sends the applicant information pertaining to taking the CLEP exam to the ACT Remote Testing Center. Testing Center contacts applicant to arrange testing center location, procedure, id required, and testing center password.



Applicant takes CLEP test at Remote Testing Center.



Upon completion of test, the applicant will receive an INITIAL test score. The applicant will receive a letter from AEE within 30 days of test completion that includes the OFFICIAL test score and application status



If all required references are in place, application is in order, applicant has met all eligibility, passed the CLEP exam, then AEE will send the applicant's file to the CLEP board for final approval



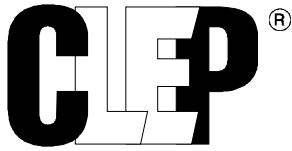
The board approval process usually takes 6-8 weeks. Once the approvals have been sent to AEE from the CLEP Board, the applicant achieves CLEP status and will receive their CLEP Certification in the mail.



Congratulations on obtaining Certified Lighting Efficiency Professional (CLEP®) status



CLEP® Application, Testing and Review Process (Exam at Remote Testing Center)



Part B: CLEP® APPLICATION

Remote Testing Center Exam & CLEP Study Guide Version

DOCUMENTS MUST BE TYPED OR PRINTED, FILLED OUT COMPLETELY AND MAILED TO THE AEE OFFICE
(Note: Seminar registration is separate registration from this Certification Application)

Please use this form only if you plan on taking the CLEP Certification Exam held in-conjunction with an Online AEE Seminar

Link to Remote Testing Center Locations: <http://www.act.org/actcenters/locate/index.html>

1) Seminar Name / Date / Location (if applicable): _____

Certified Lighting Efficiency Professional Application (Live Seminar Exam Version)

After AEE, verifies and approves your information provided, you will receive additional instructions on the Certification. You will be required to show your id. The following information is to be filled out as completely as possible. Please read the "Information for Applicants" very carefully, and also follow instructions for completing and forwarding forms. It is important that the AEE Certification Board have substantiating data for each criteria indicated in the application.

NOTE: APPLICATIONS MUST BE ACCOMPANIED BY THE \$400.00 FILING AND EXAMINATION FEE IN ORDER TO BE CONSIDERED. THIS APPLICATION DOES NOT AUTOMATICALLY REGISTER YOU FOR THE TRAINING SEMINAR. PLEASE COMPLETE A SEPARATE SEMINAR REGISTRATION (Live Training Programs and an Online Seminar Version available: see www.aeecenter.org/seminars for dates and locations.)

Mail application and payment to:

AEE – CLEP Certification Dept.
4025 Pleasantdale Rd. Suite 420
Atlanta, GA 30340
OR fax to: (770-447-4354)

Payment enclosed \$ _____ Ck# _____
Credit Card#: _____
Amex _____ Visa _____ Mastercard _____
Expiration Date: _____
Billing Address: _____
City: _____ State: _____ Zip: _____
Signature: _____

(PLEASE PRINT OR TYPE)

Personal Data (Complete Below)

File Number: _____ (CLEP- AEE Internal Use Only)

Last Name: _____ First: _____ Middle Int. _____

Job Title: _____ Social Security No. (optional): _____

Firm Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax : _____ E-mail: _____

Residence Address _____

City _____ State _____ Zip _____

Phone: _____ Address Requested for Correspondence: _____ Business _____ Residence _____

**DIVISION III
EXPERIENCE RECORD
(MAXIMUM POINTS 700)**

Applicant should forward one copy of the Employment Verification Form to each employer for those periods which apply to Certification Eligibility. Forms may be addressed to either immediate superiors or to personnel offices.

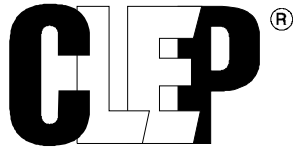
Please complete the following in chronological order. Include a description of lighting job functions held for those periods of employment, which qualify you for specific category of certification as applied for. This form may be copied if additional space is needed.

Most Recent Employment First

Are you a Lighting Consultant: Yes No

Date: From-To	Employer Name & Address	Concise Statement of Employment Experience Please provide Lighting Efficiency Job Functions
	TITLE OF POSITION	
Date: From-To	Employer Name & Address	Concise Statement of Employment Experience Please provide Lighting Efficiency Job Functions
	TITLE OF POSITION	
Date: From-To	Employer Name & Address	Concise Statement of Employment Experience Please provide Lighting Efficiency Job Functions
	TITLE OF POSITION	

Candidate may obtain 350 points for 3 years of full-time energy experience; 50 points per year thereafter, up to a maximum of 700 points.



REFERENCES

Furnish the names and addresses of at least two references:

The official AEE Certification Form for REFERENCES is to be forwarded by Applicant to the individuals listed below and returned directly by referees to AEE at the address indicated on the referral form.

Name	Company and Address	Position	Specify if referral is a P.E., R.A. or CEM

CLEP Applicant Signature / Obligation

I _____ (Signature Required), having completed the aforementioned to the best of my ability, do hereby apply for AEE Lighting Efficiency Professional and wish to take the CLEP Examination.

Applicant Affidavit

I hereby agree (a) to be bound by terms and provisions of the Certificate of Incorporation of the Association of Energy Engineers, its by-laws and such other regulation as may from time to time be in force, so far as they may affect me; (b) to indemnify and hold harmless each and all of your members, Board of Directors, Certification Board, officers, examiners and agents from and against any liability whatsoever in respect to any act or omission by you or them or any of them in connection with this application, the examination, the grades given upon such examination, and/or the granting or issuance of a failure to grant or issue a certificate to me; (c) that any prescribed fee paid by me is not refundable; and (d) that any certificate granted or issued me shall remain the property of the Association. *I certify that all the information contained in this application is correct to the best of my knowledge.*

I further pledge myself hereby to the highest ethical standards in the practice of energy engineering/management.

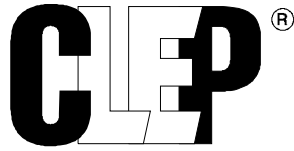
Applicant Signature Required: _____ **Date:** _____

Internal Use - Certification Board Use only The AEE Certification Board, acting at its regular meeting on _____ 20__ has _____ approved _____ disapproved this application as presented for certification classification _____ by _____, No. _____.

Secretary, AEE Certification Board

Date

DO NOT COMPLETE THIS SECTION / BOX

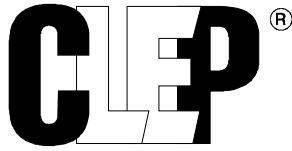


LIGHTING PROJECT SUMMARY

Please describe lighting projects, new design or retrofit that you have been responsible or worked on.

Applicant Name: _____

Project Name & Description	Describe Your Role & Responsibilities	New or Retrofit	Number & Types of Fixtures (Old & New for Retrofit)	Type of Facility	Project Cost	Date of Completion



REQUEST FOR REFERENCE INFORMATION

Certified Lighting Efficiency Professional

From: _____

To: _____ Date: _____

Dear _____:

I am applying to the Association of Energy Engineers for Certification for Lighting Efficiency Professional. In this regard, I hereby authorize your release of the requested information.

Please furnish the requested information as completely as possible, and return to the AEE Certification Board.

The receipt of replies will be reported by AEE, but under no circumstances will the information be divulged to me, or used for any purpose except to validate my application for Lighting Efficiency Professional Certification.

Sincerely,

Applicant (Signature)

APPLICANT PLEASE FILL IN (type or print) / Attach to Cover Letter

Name:

Address:

City:

State:

Zip:

REFERAL PLEASE COMPLETE LETTER OF REFERENCE

Date:

Name:

Company:

Telephone:

Address:

City:

State:

Zip:

The above named applicant I have known personally from

to

I am personally familiar with the professional work of the applicant

____yes

____no

If yes, please state relationship and brief description of character of work.

Do you know any reason why candidate should be denied certification?

____yes

____no

If yes, please state reason.

To the best of my knowledge, I hereby attest that the above information is true and correct.

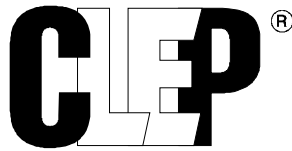
Name of person supply information: _____

(Please type or print)

Official Title of Respondent: _____

Signature: _____ Date: _____

**Return to: AEE CERTIFICATION BOARD - CLEP
4025 PLEASANTDALE RD. Suite 420
ATLANTA, GEORGIA 30340**



**REQUEST FOR EMPLOYMENT AND
JOB DUTIES VERIFICATION**

Certified Lighting Efficiency Professional

From: _____

To: _____ **Date:** _____

Dear _____:

I am applying to the Association of Energy Engineers for Certified Lighting Efficiency Professional. In this regard, I hereby authorize your release of the requested information enclosed which verifies my employment and duties from the period _____ to _____.

Please furnish the requested information as completely as possible, and return to the AEE Certification Board.

The receipt of replies will be reported by AEE, but under no circumstances will the information be divulged to me, or used for any purpose except to validate my application for Lighting Efficiency Professional Certification.

Applicant (Signature)

APPLICANT PLEASE FILL IN (type or print) / Attach to Cover Letter

Date: _____

Name: _____

Address: _____

City: _____

State: _____

Zip: _____

LETTER OF EMPLOYMENT and JOB DUTIES VERIFICATION

The following information verifies the employment and duties of the above applicant for
AEE Certification

Company: _____

Telephone: _____

Address: _____

City: _____

State: _____

Zip: _____

The above named applicant was (has been) employed by our company from
_____, to _____. Has held the following positions:

_____	Dates: _____
_____	Dates: _____
_____	Dates: _____
_____	Dates: _____

Please describe in full the responsibilities of the applicant. Attach descriptions if necessary to answer fully. Please include lighting related details. (REQUIRED)

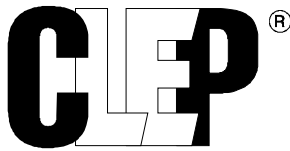
To the best of my knowledge, and our employment records, I hereby attest that the above information is true and correct.

Name of person supplying information:
(Please print or type) _____

Official Title of Respondent _____

Signature _____ Date: _____

**Return to: AEE CERTIFICATION BOARD - CLEP
4025 PLEASANTDALE RD. Suite 420
ATLANTA, GEORGIA 30340**



**REQUEST FOR VERIFICATION OF ENGAGEMENT
Certified Lighting Efficiency Professional**

From: _____

To: _____ **Date:** _____

Dear _____:

I am applying to the Association of Energy Engineers for Certification as a Lighting Efficiency Professional (CLEP). In this regard, I hereby authorize your release of the requested information enclosed which verifies my engagement and duties from the period _____ to _____.

Please furnish the requested information as completely as possible, and return to the AEE Certification Board.

The receipt of replies will be reported by AEE, but under no circumstances will the information be divulged to me, or used for any purpose except to validate my application for Lighting Efficiency Professional Certification.

_____ (Signature)
Applicant

APPLICANT PLEASE FILL IN (type or print) / Attach to Cover Letter

Date: _____

Name:

Address:

City:

State:

Zip:

Client Complete: LETTER OF CLIENT VERIFICATION

The following information verifies the Contractor/Consultant and duties of the above applicant for AEE Certification

Client

Company:

Telephone:

Address:

City:

State:

Zip:

The above contractor/consultant has provided service(s) to our company from these dates:

Please describe in full the responsibilities of the applicant. Attach descriptions if necessary to answer fully. Please include energy-related details. (REQUIRED)

To the best of my knowledge, I hereby attest that the above information is true and correct.

Name of person supply information: _____

(Please type or print)

Official Title of Respondent: _____

Signature: _____ Date: _____

Applicant: Please provide (3) client verifications from (3) different companies.

Photocopies are acceptable.

**Return to: AEE CERTIFICATION BOARD-CLEP
4025 PLEASANTDALE RD. Suite 420
ATLANTA, GEORGIA 30340**

Part C: STUDY GUIDE

CERTIFIED LIGHTING EFFICIENCY (CLEP[®] EXAM)

STUDY GUIDE

CERTIFIED LIGHTING EFFICIENCY PROFESSIONAL EXAM

The following is a list of subjects for the CLEP examination. Each subject covers a number of topics. The list of topics is suggested references. The CLEP examination may contain additional subjects. The two primary references are Applied *Illumination Engineering Reference Book* and ASHRAE/IES Standard 90.1

The examination will be an open book and allows four hours for completion of exam. The types of questions presented are multiple choice and true and false. The total maximum score on the exam is 1000. The written examination has 10 sections, which include:

Codes & Standards	10 questions	Lighting Controls	10 questions
Lighting Evaluation	15 questions	Lighting System Maintenance	10 questions
Lighting Fundamentals	10 questions	Quantity & Quality of Illumination	10 questions
Design Basics	15 questions	Environmental & Safety	10 questions
Lamps & Ballast	10 questions	DSM & Lighting Efficiency	10 questions

STUDY GUIDE TOPICS & REFERENCES

1. Codes & Standards

- 1.1 ASHRAE/IES Standard 90.1
- 1.2 National Electrical Code
- 1.3 Certified Ballast Manufacturers Association Standards
- 1.4 ANSI Standard for Fluorescent Lamps

RE: *ASHRAE/IES Standard 90.1; Applied Illumination Engineering Reference*

2. Lighting Evaluation & Economics

- 2.1 Interest Formulas
- 2.2 Interest Tables
- 2.3 Rate of Return Analysis
- 2.4 Payback Analysis
- 2.5 Effect of Fuel Escalation on Life-Cycle Costing
- 2.6 Economic Comparisons of Lighting Systems

RE: *Applied Illumination Engineering*

3. Lighting Fundamentals

- 3.1 Nature of Light
- 3.2 Color Temperature
- 3.3 Color Rendering Index
- 3.4 Fundamental Lighting Units & Relationship
- 3.5 Fundamental Lighting Calculations
- 3.6 Photometric Test Reports
- 3.7 Candela Distribution Curves
- 3.8 Coefficient of Utilization
- 3.9 Lamp Lumen Depreciation
- 3.10 Inverse Square Law

RE: Applied Illumination Engineering

4. Design Basics

- 4.1 Zonal Cavity Method
- 4.2 Determination of Effective Cavity Reflectance
- 4.3 Calculating Illumination at a Point
- 4.4 Light Loss Factor
- 4.5 Energy Management
- 4.6 Types of Lighting Systems
- 4.7 Typical Lighting applications
 - a. Industrial
 - b. Office
 - c. Outdoor
 - d. Merchandise
 - e. Educational

RE: Applied Illumination Engineering

5. Lamps & Ballasts

- 5.1 Light Sources
 - a. Incandescent Lamps
 - b. Reflector Lamps
 - c. Fluorescent Lamps
 - d. High Intensity Discharge Lamps
 - 1. Mercury Vapor
 - 2. Metal Halide
 - 3. Low Pressure Sodium
 - 4. High Pressure Sodium
 - e. Halogen Cycle PAR Lamps
 - f. Tubular Quartz Lamps
- 5.2 Ballast
 - a. Ballast Factor
 - b. Ballast Efficacy Factor
 - c. Electronic Ballasts
 - d. Magnetic Ballasts

RE: Applied Illumination Engineering

6. Lighting Controls

- 6.1 Automatic Switches & Time Clocks
- 6.2 Photocells
- 6.3 Occupancy Sensors
 - a. Ultrasonic
 - b. Infrared
- 6.4 Dimmers
- 6.5 Contractors
- 6.6 Hard Wiring
- 6.7 Power Line Carriers

RE: Applied Illumination Engineering

7. Lighting System Maintenance

- 7.1 Group Relamping
- 7.2 Luminaire Dirt Depreciation
- 7.3 Room Surface Dirt Depreciation

RE: Applied Illumination Engineering

8. Quantity & Quality of Illumination

- 8.1 Psychological Factors
- 8.2 Physical Factors
- 8.3 Luminance Ratios
- 8.4 Measuring Quantity of Illuminance
- 8.5 Disability Glare
- 8.6 Discomfort Glare
- 8.7 Veiling Reflections
- 8.8 Visual Comfort Probability

RE: Applied Illumination Engineering

9. Environmental & Safety

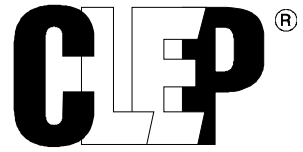
- 9.1 EPA Energy Star Program
- 9.2 Disposal of Old Lamps and Ballasts
- 9.3 Safety Considerations for Metal Halide & Mercury Vapor Lamps

RE: Applied Illumination Engineering

10. DSM & Lighting Efficiency

- 10.1 Unit Power Density
- 10.2 Utility Incentive and Rebate Programs
- 10.3 Demand-Side Management
- 10.4 Energy Management Considerations
- 10.5 EPA

RE: ASHRAE Standard 90.1; Applied Illumination Engineering



CEM EXAM REVIEW QUESTIONS (Sample Only)

Some of these review questions may be more complex or difficult than the exam but will be good practice problems.

CERTIFIED LIGHTING EFFICIENCY PROFESSIONAL (CLEP) Sample Exam QUESTIONS

1. In applying ASHRAE/IES Standard 90.1 to calculate unit lighting power allowance (ULPA), no credit is allowed for which of the following types of lighting control when calculating lighting power control credits (LPCC)?

- A) Daylight sensing
- B) Occupancy Sensors
- C) Programmable Timers
- D) Interval timers

2. What is the internal rate of return, before taxes, on an investment for upgrading lamps which will cost \$50,000 to install, have a three-year life, and result in cost savings of \$ 25,615 each year?

- A) 17 %
- B) 25%
- C) 51 %
- D) 65 %

3. In normal operation, which lamp type exhibits the worst lumen depreciation?

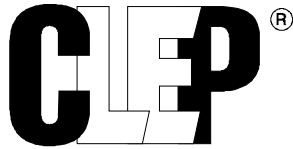
- A) Mercury Vapor
- B) Low Pressure Sodium
- C) Metal Halide
- D) T12 “Energy-saving” Fluorescent

4. How many luminaires are required given the following:

Area: 50,000 square feet
Required foot-candle level: 50 fc
Coefficient of Utilization: .76
Light Loss Factor .65

1 lamp, 400 watt high pressure sodium luminaires. Lamps have an initial lumen rating of 50,000

- A) 25
- B) 102
- C) 150
- D) 494



CLEP EXAM REVIEW ANSWER KEY:

- | | | | |
|----|----|-----|----|
| 1. | D. | 6. | D. |
| 2. | B. | 7. | C. |
| 3. | A. | 8. | B. |
| 4. | B. | 9. | B. |
| 5. | C. | 10. | D. |

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CLEP application, procedures, requirements, and eligibility are subject to change.