ФГБОУ ВПО «КУБАНСКИЙ ГОСУДАРСТВЕННЫЙ

АГРАРНЫЙ УНИВЕРСИТЕТ»

ФАКУЛЬТЕТ ЭНЕРГЕТИКИ И ЭЛЕКТРИФИКАЦИИ

Кафедра применения электрической энергии

**РАБОЧАЯ ТЕТРАДЬ**

к лабораторным работам по курсу

«СВЕТОТЕХНИКА»

Студент \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Группа\_\_\_\_\_\_\_\_\_\_\_\_\_

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Учебно-методическое пособие предназначено для студентов высших учебных заведений очной формы обучения, занимающихся по специальности – 110800.62 - Агроинженерия по профилю подготовки «Электрооборудование и электротехнологии»

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**ВВЕДЕНИЕ**

Перед началом выполнения работ в лаборатории "Светотехники" студент обязан изучить приведенные ниже правила и принять их к обязательному выполнению.

**Подготовка к лабораторным работам**

Лабораторные занятия преследуют цель более глубокого усвоения теоретических вопросов путём экспериментальной проверки основных положений курса. Кроме того, эти занятия способствуют выработке навыков проведения исследований и анализа, полученных в результате эксперимента денных.

Приступая к выполнению работы, студент должен иметь ясное и конкретное представление о поставленной перед ним задаче. Хорошо знать устройство тех приборов и аппаратов, которыми предстоит пользоваться при выполнении работы, а также понимать работу исследуемого оборудования.

Так как изучение теоретического курса и лабораторные занятия проводятся параллельно, студенту часто придется выполнять лабораторные работы по разделам курса, которые на теоретических занятиях ещё, не рассматривались, либо по разделам, которые вынесены для самостоятельной проработки. Для облегчения подготовки к лабораторным работам в описаниях работ приводятся краткие сведения по вопросам, недостаточно освещенным в литературе, а также указывается дополнительная литература.

Каждый студент обязан подготовиться к самостоятельному выполнению лабораторной работы. Предварительная подготовка состоит в изучении описания лабораторной работы и соответствующего теоретического материала по конспекту и учебным пособиям. Рекомендуется заранее вычертить электрические схемы и подготовить таблицы для записи наблюдений.

**Порядок проведения лабораторных работ**

Лабораторные работы выполняются бригадой студентов в количестве 3-4 человек. Каждая бригада должна выполнить все лабораторные работы, предусмотренные календарно-тематическим планом.

Перед началом работы нужно подробно ознакомиться с находящимся на рабочем месте оборудованием, то есть узнать назначение каждого элемента оборудования, основные номинальные данные объекта испытания, а для приборов - пределы измерений, род тока и цену деления шкалы. При наличии на рабочем месте автотрансформаторов типа "ЛАТР" и реостатов следует установить начальное положение их движков.

Начинать работу следует с выписки паспортных данных аппаратов и приборов, размещенных на лабораторно-испытательных стендах и столах, а затем приступить, если это необходимо, к сборке схем.

При выполнении работы бригадой студенты должны распределить обязанности и затем ими меняться. При этом все должны активно вникать в смысл проводимых испытаний.

За порчу электрооборудования, вызванную самовольным включением электрических схем под напряжение, виновные несут материальную ответственность.

Включать напряжение (рубильниками, автоматами) можно лишь убедившись в том, что никто из присутствующих в лаборатории не может попасть под напряжение. При включении предупреждать товарищей словом "ВКЛЮЧАЮ!".

для записи экспериментальных данных следует каждой бригаде иметь специальную тетрадь, где до получения зачёта по лабораторным работам должны сохраняться все черновики протоколов проведенных работ, подписанные в конце занятий преподавателем. В процессе проведения лабораторных работ по данным замеров строятся графики и прикладываются к черновикам протоколов.

Во время выполнения лабораторных работ студенты должны строго выполнять правила техники безопасности и соблюдать учебную дисциплину. Лица, нарушающие правила безопасности, отстраняются от выполнения работы.

Проводя те или иные испытания, необходимо особенно тщательно наблюдать за показаниями приборов, правильно и быстро отсчитывать их показания и сразу же записывать. Следует помнить, что небрежность в отсчёте показаний приборов и записях обычно приводит к неправильным выводам о свойствах испытуемой схемы. Если результаты наблюдений будут признаны неудовлетворительными или содержать грубые ошибки, то опыт необходимо повторить.

Экспериментальная часть работы считается выполненной только после проверки и утверждения результатов опытов преподавателем.

После окончания лабораторной работы необходимо оборудование и приборы оставить на рабочем месте в том порядке, в каком они находились перед началом занятий. После этого студенты приступают к оформлению отчёта.

**Оформление и сдача отчёта по лабораторной работе**

Оформленный отчёт о проделанной работе представляется и защищается каждым студентом на следующем занятии. *Без представления отчёта по предыдущей работе студент к следующему занятию не допускается*. *Если студент не защитил отчёты по предыдущей работе, к следующей работе он не допускается*.

Отчёт оформляется в рабочей тетради. Записи в отчёте выполняются чернилами или шариковой ручкой, графики, эскизы и схемы вычерчиваются карандашом. Следует строго придерживаться правил начертания и обозначения элементов согласно ГОСТам ЕСКД.

Все графики должны быть выполнены, в отведенном для этого месте; координатные оси графиков должен иметь обозначения изображаемых величин, размерность и масштаб. На графиках обязательно должны быть нанесены точки, по которым строились кривые.

Отчёт должен содержать:

–название работы, цель работы;

–электрические схемы всех цепей, исследованных в данной работе;

–таблицы, графики или иные результаты всех опытов, проведённых в работе;

–расчётные формулы и результаты вычислений;

–анализ результатов и выводы.

Работа засчитывается в том случае, если студент показывает знание цели; методики выполнения работы; принципа действия и конструкции использованных аппаратов, приборов и машин, демонстрирует знание контрольных вопросов; работы схем управления; а также может объяснить и проанализировать полученные результаты вычислений и графики.

**Техника безопасности при проведении лабораторных работ**

Во избежание несчастных случаев, аварий и поломок оборудования студент обязан выполнять правила техники безопасности и правила эксплуатации электрооборудования Основным условием безопасной работы в лаборатории является исключение прикосновения к токоведущим неизолированным частям электроустановок при наличии на них напряжения и облучения УФ- и ИК-лучами незащищённых частей тела. Для того чтобы выполнить эти условия следует соблюдать следующие правила:

1). При каждом включении напряжения предупреждать товарищей словом "ВКЛЮЧАЮ".

2). Переключения под напряжением производить только с помощью рубильников, контакторов и других предназначенных для этого устройств, предусмотренных в схеме.

3). При обнаружении в электрических установках, приборах, предохранителях, и других технических устройствах неисправности студент обязан поставить в известность преподавателя. Если установка неисправна и выполнение работы опасно, студент обязан немедленно прервать работу до приведения установки в надлежащий порядок.

4). Запрещается самовольно снимать ограждения безопасности (кожухи приборов, аппаратов, фанерные отгораживающие полосы и т.д.) предупредительные таблички если последние имеются.

5). Запрещается устанавливать самодельные предохранители, производить включения, разборки или какие-либо работы на других стендах без разрешения преподавателя.

6). Не следует помещать на лабораторном столе посторонние предметы, особенно металлические (линейки, инструменты, провода и т.д.).

7). При выполнении лабораторной работы следует находиться только на своем рабочем месте, не трогать оборудования и приборов, не относящихся к работе, не переносить со стола на стол аппараты, приборы и прочее оборудование.

8). Категорически запрещается садиться или ставить ноги на электрические установки или другое оборудование, касаться рукой вращающиеся частей электрических машин или производить их торможение.

9). При работе с действующими источниками УФ-излучения необходимо избегать облучения незащищенных частей тела. Смотреть незащищёнными глазами на источники УФ-излучения запрещается.

10). Во избежание ожогов запрещается прикасаться к колбам источников оптического излучения, особенно ламп накаливания.

При несчастном случае немедленно оказать первую помощь пострадавшему. Аптечки скорой помощи находятся у заведующего лабораторией. В случае необходимости вызвать скорую помощь по телефону 03.

Дата:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Подпись: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Лабораторная работа №1*

**Изучение источников теплового изЛучения**

1. Цель работы:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Принципиальная схема электрической установки

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***Литература***

1. Живописцев Е.Н., Косицин О.А. Элекротехнология и электрическое освещение.–М.: Агропромиздат, 1990.–303 с.

2. КноррингГ.М.и др. Справочная книга для проектирования электрического освещения / Г.М. Кнорринг, И.М. Фадин, В.Н. Сидоров–2-е изд., переб. и доп.–СПб.:Энергоатомиздат. Санкт-Петербургское отд-ние, 1992.–448 с (64 - 74c).

3. Козинский В.А. Электрическое освещение и облучение.–М.: Агропромиздат, 1991.–239 с (47 - 58c).

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Преподаватель:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(Дата) (Роспись)

*Лабораторная работа №2*

**Изучение газоразрядных источников и пускорегулирующей аппаратуры**

1. Цель работы:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Принципиальная схема электрической установки

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***Литература***

1. Живописцев Е.Н., Косицин О.А. Элекротехнология и электрическое освещение.–М.: Агропромиздат, 1990.–303 с.

2. КнорингГ.М.и др. Справочная книга для проектирования электрического освещения / Г.М. Кноринг, И.М. Фадин, В.Н. Сидоров–2-е изд., переб. и доп.–СПб.: Энергоатомиздат. Санкт-Петербургское отд-ние, 1992.–448 с (74 – 80c).

3. Козинский В.А. Электрическое освещение и облучение.–М.: Агропромиздат, 1991.–239 с (58 – 71c).

Преподаватель:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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*Лабораторная работа №3*

**Устройство, принцип действия приборов для измерения освещённости и ультрафиолетового излучения и правила пользования**

1. Цель работы:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Принципиальная схема электрической установки

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Ответы на контрольные вопросы\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 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***Литература***

1. Живописцев Е.Н., Косицин О.А. Элекротехнология и электрическое освещение.–М.: Агропромиздат, 1990.–303 с.

2. Козинский В.А. Электрическое освещение и облучение.–М.: Агропромиздат, 1991.–239 с (31 – 46c).

Преподаватель:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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*Лабораторная работа № 4*

**ИЗУЧЕНИЕ СВЕТИЛЬНИКОВ И ИССЛЕДОВАНИЕ ИХ ХАРАКТЕРИСТИК**

1. Цель работы:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Принципиальная схема электрической установки

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1. Таблицы, графики, формулы

Таблица №1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Наименование светильника | Напряжение на лампе, В | Угол направления силы света, град | Освещенность, лк | Расстояние от светильника, м | Сила света, Кд |
| Светильник с лампой накаливания | 220 | 0 |  |  |  |
| 220 | 10 |  |  |  |
| 220 | 20 |  |  |  |
| 220 | 30 |  |  |  |
| 220 | 40 |  |  |  |
| 220 | 50 |  |  |  |
| 220 | 60 |  |  |  |
| 220 | 70 |  |  |  |
| 220 | 80 |  |  |  |
| 220 | 90 |  |  |  |

Таблица № 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Наименование светильника | Напряжение на лампе, В | Угол направления силы света, град | Освещенность, лк | Расстояние от светильника, м | Сила света, Кд |
| Люминесцентный светильник | 220 | 0 |  | 0,65 |  |
| 220 | 10 |  | 0,65 |  |
| 220 | 20 |  | 0,65 |  |
| 220 | 30 |  | 0,65 |  |
| 220 | 40 |  | 0,65 |  |
| 220 | 50 |  | 0,65 |  |
| 220 | 60 |  | 0,65 |  |
| 220 | 70 |  | 0,65 |  |
| 220 | 80 |  | 0,65 |  |
| 220 | 90 |  | 0,65 |  |

Таблица № 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Опытные данные | | | | | | | | Расчетные данные | | | | | |
| U | | I | | P | | E | | R | | Ф | | I | |
| В | % | А | % | Вт | % | лк | % | Ом | % | лм | % | кд | % |
| 240 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 230 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 220 | 100 |  | 100 |  | 100 |  | 100 |  | 100 |  |  |  |  |
| 210 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 200 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 190 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 180 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 170 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 160 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 150 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 140 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 130 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 120 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 110 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 100 |  |  |  |  |  |  |  |  |  |  |  |  |  |

Таблица № 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Опытные данные | | | | | | | | Расчетные данные | | | | | |
| U | | I | | P | | E | | R | | Ф | | I | |
| В | % | А | % | Вт | % | лк | % | Ом | % | лм | % | кд | % |
| 240 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 230 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 220 | 100 |  | 100 |  | 100 |  | 100 |  | 100 |  |  |  |  |
| 210 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 200 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 190 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 180 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 170 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 160 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 150 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 140 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 130 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 120 |  |  |  |  |  |  |  |  |  |  |  |  |  |

Формулы:

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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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График зависимости Рл, Е, Rл, Iл= f (Uл)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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1. Выводы\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Ответы на контрольные вопросы\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 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***Литература***

1. Жилинский Ю.М., Кумин В.Д. Электрическое освещение и облучение. - М. Колос, 1982.

2. Айзенберг Ю.Б. Световые приборы. - М. Энергия, 1980.

3. Мешков В.В., Епанешников М.М. Осветительные установки, - М. Энергия, 1972.

4. Кнорринг Г.М. и др. Справочная книга для проектирования электрического освещения–СПб.: Энергоатомиздат. Санкт-Петербургское отд-ние, 1992.–448 с (93 – 133c).

Преподаватель:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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*Лабораторная работа №5*

**ИЗУЧЕНИЕ КОНСТРУКЦИИ И СХЕМ ВКЛЮЧЕНИЯ**

**СВЕТОДИОДНЫХ ЛАМП**

1. Цель работы:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Принципиальная схема электрической установки

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***Литература***

1. Живописцев Е.Н., Косицин О.А. Элекротехнология и электрическое освещение.–М.: Агропромиздат, 1990.–303 с.

2. Козинский В.А. Электрическое освещение и облучение.–М.: Агропромиздат, 1991.–239 с.

Преподаватель:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(Дата) (Роспись)

*Лабораторная работа №6*

**ИЗУЧЕНИЕ ЛАМП ДРЛ И ДНаТ, СХЕМ ИХ ВКЛЮЧЕНИЯ**

1. Цель работы:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Принципиальная схема двухлампового пускорегулирующего устройства.

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1. Таблицы, графики, формулы

Таблица № 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| t, м | I, A | Uдр, B | Uл, B | E, лк |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |
| 6 |  |  |  |  |
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| 9 |  |  |  |  |
| 10 |  |  |  |  |

Таблица № 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| U, B | 220 | 210 | 200 | 190 | 180 | 170 | 160 | 150 | 140 | 130 | 120 | 110 | 100 | 90 |
| I, A |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| E, лк |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Таблица № 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| --- | --- | --- | --- | --- |
| t, c | I, A | Uдр, B | Uл, B | E, лк |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
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| 4 |  |  |  |  |
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Таблица № 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| U, B | 220 | 210 | 200 | 190 | 180 | 170 | 160 | 150 | 140 | 130 | 120 | 110 | 100 | 90 |
| I, A |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| E, лк |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Графики зависимости I = f (t), Uвр = f (t), Uл, E = f (t), I = f (U), E = f (U)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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1. Выводы\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Ответы на контрольные вопросы\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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***Литература:***

1. КнорингГ.М.и др. Справочная книга для проектирования электрического освещения / Г.М. Кноринг, И.М. Фадин, В.Н. Сидоров–2-е изд., переб. и доп.–СПб.: Энергоатомиздат. Санкт-Петербургское отд-ние, 1992.–448 с (80 – 87c).

2. Козинский В.А. Электрическое освещение и облучение.–М.: Агропромиздат, 1991.–239 с (71 – 82c).

Преподаватель:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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*Лабораторная работа № 7*

**ИССЛЕДОВАНИЕ РАБОТЫ ЛЮМИНЕСЦЕНТНОЙ ЛАМПЫ С РАЗЛИЧНЫМИ БАЛАСТАМИ**

1. Цель работы:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Принципиальная схема с индуктивным балластом.

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1. Таблицы, графики, формулы

Таблица № 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Таблица № 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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График зависимости I = f (U),Руст = f (U), Рл,ηбл, ηл, cosφ, Киск, F = f (U)

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1. Выводы\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
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***Литература:***

1. Жилинский Ю.М. , Кумин В. Д. Электрическое освещение и облучение.М., Колос, 1982.

2. Козинский В.А. Электрическое освещение и облучение.–М.: Агропромиздат, 1991.–239 с (75 – 79c).

3. Фугенфиров М.И. Электрические схемы с газоразрядными лампами, М., Энергия, 1974.

Преподаватель:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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*Лабораторная работа №8*

**ИССЛЕДОВАНИЕ РАБОТЫ РТУТНО–КВАРЦЕВЫХ ЛАМП**

1. Цель работы:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Принципиальная схема.

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1. Таблицы, графики, формулы

Таблица № 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| Время, мин | Uс, В | I, А | Pу, Вт | Uл, В | Uл, Вт | Uбл, В | Pбл, Вт | E, мэр/м2 |
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Таблица № 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| Ток лампы, А | Номи-нальноенапряже-ние сети, В | Пусковой ток,  А | Продолжитель-  ностьразгора-ния лампы, мин | При установившемся режиме | | |
| Ток лампы, А | Напря-жение на лампе, В | Мощность лампы, Вт |
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Таблица № 3.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| Uс, B | I, A | Pу, Вт | Uл, B | Pл, Вт | Uбл, B | cosφ | Pбл, Вт | E, мэр/м2 |
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Формулы:

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Графики зависимости Iл = f (U),Uл, Uдр = f (U), Рл, Рдр = f(U), Ф = f (U), cosφ = f (U)

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1. Выводы\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Ответы на контрольные вопросы\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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***Литература:***

1. Жилинский Ю.М. , Кумин В. Д. Электрическое освещение и облучение.М., Колос, 1982.

2. Козинский В.А. Электрическое освещение и облучение.–М.: Агропромиздат, 1991.–239 с (149 – 162c).

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