BITS, PILANI K K BIRLA GOA-CAMPUS

SEMESTER-I, 2022-2023

MID-SEMESTER EXAMINATION

COURSE: EEE_F427 ELECTRIC POWER UTILIZATION AND ILLUMINATION

REG, WT 30%, CB **DATE: 01-NOV-2022**
MM 60 **TIME: 90 MIN.**
VENUE: C-405 **11.30 A.M. TO 1 P.M.**

INSTRUCTIONS:

1. ***The Question Paper contains Two Main Questions, each containing a set of equal number of sub-questions. Each main question contains 15 sub-question and carries 30 Marks. All sub-questions carry equal marks.***
2. ***You should attempt all the questions (Main & Sub-questions) in the serial order their appearance.***
3. ***Write precise and complete answer(s) to a question. You must identify your answer with correct main Question number and sub-question number. Do not write statement of a Question or sub-question. If you choose NOT to answer a question (main or sub-question), write "Not Attempted" or "NA" against the corresponding question number (Main or Sub-question) and move on. Invalid answers may be awarded equivalent negative marks.***
4. ***Only complete and correct answers will be awarded full marks as shown. If a sub-question requires you to write more than one answers, write all answers for completeness of the answer. No partial marks will be awarded to partially correct answer, as the answer will be treated incomplete answer.***
5. ***Non-compliance with any of the above Instructions, or instructions issued by the AUGSD will lead to rejection of the Answer Book.***

Q. 1 Check each of the following statements and state whether it is TRUE or FALSE. Also explain "Why" for justifying your answer for completeness: [2 M X 15 = 30 M]

a. **The illumination level in houses is in the range of 700–1000 lux.**
b. **Desired illumination level on the working plane depends upon the age group of the observers.**
c. **Candela is the unit of illumination.**
d. **The color temperature of day-light is about 100 K.**
e. **For an electric arc welding, the current range is usually 5 to 10 A.**
f. **The power factor of a spot welding machine is expected to be about 0.8 to 0.85 lagging.**
g. **In electric resistance welding, the current ranges between 4 to 12 Amps and voltage ranges between 100 to 200 V.**
h. **The power factor will be leading in case of electric arc heating.**
i. **Hysteresis loss and eddy current loss are used in induction heating of brass.**
j. **For heating of plywood, the supply frequency should be 100 Hz.**
k. **The power factor of the arc furnaces is generally power factor of 0.7 leading.**
l. **The load factor for domestic loads is normally taken to be in the range 50 - 60%.**
m. **The power generating plant based on non-conventional sources of energy must always be operated as a grid integrated power plant.**
n. **The large size steam plants and nuclear plants are suitable for meeting peak loads.**

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o. **A plant of with installed capacity 100 MW, has a load factor of 0.5 and a utilization factor 0.2, therefore it has average demand of 50 MW.**

Q.2 Write precise and complete answers to following questions, in the order of appearance: **[2 M X 15 = 30 M]**

1. **What the objectives electric power utilization in industrial environment? How can different functions of energy management help achieve these objectives?**
2. **What are the important issues in producing electric power using non-conventional energy sources? What are the provisions made by the Govt for addressing these issues?**
3. **What are the measures recommended for ensuring safety of electrical appliances and electrical wiring?**
4. **How can specific electricity consumption on campus of our Institute be defined? Recommend at least four measures to improve the specific electricity consumption on campus.**
5. **How is meant by 'heat rate' defined for a thermal power station? Why it is desired to be a low value?**
6. **Which type electricity tariff is applicable for our Institute? What are the steps in computing the amount of monthly electricity bill?**
7. **Which type of meter is used for billing purposes by utility in our Institute? How is maximum billing demand recorded for computing the demand charges?**
8. **The maximum demand on the two power stations is the same. However, the load factor for the station-1 is 10% and for the station-2 it is 20%. What is the ratio of the units generated by station-1 to those generated by the station-2?**
9. **What are the various losses occurring in resistance oven? How can these be controlled effectively?**
10. **State any two of distinct advantages of dielectric heating. Suggest effective method for controlling dielectric heating?**
11. **How is amount of heat input controlled in high frequency eddy current heating? What leads to 'pinching effect'?**
12. **State four essential requirements of good lighting. Which different schemes of lighting are generally used? What is the normally used empirical formula for calculating the number of lamps required for illumination?**
13. **State the two laws of illumination. Illustrate with neatly labeled diagrams.**
14. **Define (i) plane angle, (ii) solid angle. Illustrate with neatly labeled diagrams.**
15. **Define the following terms: (i) Mean horizontal candle power, (ii) Mean spherical candle power, (iii) Mean hemispherical candle power, (iv) Luminous flux.**

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