

III B. Tech II Semester Regular/Supplementary Examinations, April - 2017**UTILIZATION OF ELECTRICAL ENERGY**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

 Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory3. Answer any **THREE** Questions from **Part-B**

PART -A

- | | | | |
|---|----|---|------|
| 1 | a) | What are the factors governing the selection of motors? | [3M] |
| | b) | On what factors dielectric losses depend? | [4M] |
| | c) | Define Illumination? | [4M] |
| | d) | What is Lamp Efficiency? | [3M] |
| | e) | What are the advantages of diesel electric traction. | [4M] |
| | f) | Define the term braking retardation. | [4M] |

PART -B

- | | | | |
|---|----|---|-------|
| 2 | a) | What are the advantages of equipment operated from high frequency supply? | [4M] |
| | b) | What is the advantage of constant current supply system? | [8M] |
| | c) | Where would you recommend slip coupling method of speed control? | [4M] |
| 3 | a) | What is welding? | [3M] |
| | b) | Describe the construction and principle of working of an induction furnace. | [8M] |
| | c) | What type of electric supply is suitable for electric arc welding? | [5M] |
| 4 | a) | Explain how emitted energy is distributed using spectral distribution curves . | [8M] |
| | b) | Explain the functionality of a Lux Meter? | [8M] |
| 5 | a) | Why tungsten is selected as filament material and on what factors its life depend? | [9M] |
| | b) | What are the advantages of fluorescent lighting over plain mercury lighting? | [7 M] |
| 6 | a) | Write the requirements of fraction motors . | [8M] |
| | b) | Review the existing electric traction systems in India. | [8M] |
| 7 | a) | A 200 tonne electric train with scheduled speed of 40 kmph runs between two stations 2 km apart with an acceleration of 2 kmphs and braking retardation of 3kmphs. The train resistance is 50 Nw-m / tonne, effect of rotational inertia 10%,over all efficiency 70% and station stop 10 sec. calculate.
i) The maximum power output from the wheels
ii) The specific energy consumption. | [8M] |
| | b) | Explain the terms
i)Adhesive weight ii)Train resistance iii)Speed time curve | [8M] |



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PART - A

- | | | |
|---|--|------|
| 1 | a) Mention advantages of electric drives over other drives. | [3M] |
| | b) What is the purpose of using reactors in electric arc furnace. | [4M] |
| | c) What is Frescher's law of illumination. | [4M] |
| | d) What are the factors affecting the design of indoor lighting installations. | [3M] |
| | e) What are the disadvantages of diesel electric traction. | [4M] |
| | f) Explain train resistance referred to traction. | [4M] |

PART - B

- | | | |
|---|--|------|
| 2 | a) What factors govern the selection of a motor for particular drive application. | [4M] |
| | b) What do you understand by matching of speed torque characteristics of load and motor? | [8M] |
| | c) In what way buck and boost method of speed control is superior to ward leonard method? | [4M] |
| 3 | a) What are different types of welding? | [3M] |
| | b) Find the energy consumed and the rating of a tin melting furnace in order to melt 500 Kg of tin in 30 minutes. Take melting point of tin as 235 ⁰ C, specific heat as 0.055, latent heat of fusion as 13.31Kcal per kg, initial temperature as 20 ⁰ C and furnace efficiency of 75% | [8M] |
| | c) What are the advantages of using coated welding electrodes? | [5M] |
| 4 | a) Describe two ways of how glare is produced and suggest how it can be avoided? | [8M] |
| | b) What are the main faults of lighting systems and how they are overcome? | [8M] |
| 5 | a) Compare fluorescent and filament lamps on basis of quality of light, capital and running costs. | [8M] |
| | b) What are the advantages of coiled coil filament gas filled lamp? | [8M] |
| 6 | a) Explain the function of a reactor used in series with traction motors? | [7M] |
| | b) What are special features of a traction motor? | [9M] |
| 7 | a) Derive the necessary expressions for tractive effort of fraction system. | [8M] |
| | b) Explain various systems of transmission of drives bringing out their merits and demerits. | [8M] |



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PART -A

- | | | | |
|---|----|--|------|
| 1 | a) | What are different types of industrial loads? | [3M] |
| | b) | Why electric heating is preferred over other methods of heating. | [4M] |
| | c) | What is Lambert's cosine law of illumination? | [4M] |
| | d) | What is illumination level? | [3M] |
| | e) | What type of motors find application in traction work? | [4M] |
| | f) | Explain accelerating weight referred to traction. | [4M] |

PART -B

- | | | | |
|---|----|---|------|
| 2 | a) | What are the conditions for stable operation of a motor? | [4M] |
| | b) | Explain the principle of operation of a saturable reactor? | [8M] |
| | c) | What are the advantages of electric drive? | [4M] |
| 3 | a) | What do you mean by negative resistance characteristics of an electric arc? | [3M] |
| | b) | A piece of insulating material is to be heated by dielectric heating. The size of the piece is 100 sq.cm area and 2.5cm thick. A frequency of 25 mega cycles is used and the power absorbed is 350W. Calculate the voltage necessary for heating and the current that flows in the material. The material has relative permittivity of 5 and a p.f. of 0.05 | [8M] |
| | c) | What is the advantage of submerged arc welding? | [5M] |
| 4 | a) | How is luminous intensity measured, explain? | [8M] |
| | b) | What are various sources of light? Write short notes on filament lamps. | [8M] |
| 5 | a) | What are discharge lamps? Explain. | [8M] |
| | b) | Write how planned maintenance of lighting installation is done? | [8M] |
| 6 | a) | What is the tractive effort required to overcome train resistance, explain? | [8M] |
| | b) | Discuss the merits and demerits of the D.C and 1-phase A.C systems for the main and suburban line electrification of the railways. | [8M] |
| 7 | a) | Explain dead weight, accelerating weight and train resistance referred to traction | [8M] |
| | b) | A train is required to run between the two stations 1.5 km apart at a schedule speed of 36 km ph, the duration of stop being 25 sec. The braking retardation is 3 kmphs. Assuming a trapezoidal speed/time curve, calculate the acceleration if the ratio of maximum speed to average speed is to be 1.25. | [8M] |



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PART -A

- | | | | |
|---|----|--|------|
| 1 | a) | What is load equalization? | [3M] |
| | b) | What are different methods of heat transfer? | [4M] |
| | c) | List out the electric welding equipment | [4M] |
| | d) | What is a cold lamp? | [3M] |
| | e) | How direction of rotation of a traction motor is reversed? | [4M] |
| | f) | Explain dead weight referred to traction. | [4M] |

PART -B

- | | | | |
|---|----|---|-------|
| 2 | a) | What are relative advantages and disadvantages of d.c.and a.c. drives? | [4M] |
| | b) | What are the different classifications of load and how they affect the motor selection? | [8M] |
| | c) | For what type of speed torque characteristic, would you recommend shunt motor? | [4M] |
| 3 | a) | What is the technique of weld metal deposition by electric arc? | [3M] |
| | b) | What are specific advantages and applications of dielectric heating? | [8M] |
| | c) | What are the qualities of a good weld? | [5M] |
| 4 | a) | Explain about typical polar curves of a filament lamp. | [8M] |
| | b) | What is depreciation factor? Compare the depreciation curves for various types of lamps. | [8M] |
| 5 | a) | Write a brief note on LED lighting. | [6M] |
| | b) | Explain the “silhouette” principle on which modern street lighting depends? | [10M] |
| 6 | a) | What is notching up period? Write brief note on speed time curves of trains. | [8M] |
| | b) | Define the term tractive effort. Derive the condition for tractive effort required to balance the gravitational pull. | [8M] |
| 7 | a) | What are the advantages and disadvantages of thyristor controlled traction motors? | [8M] |
| | b) | Discuss the suitability of d.c.shunt and series machines for regenerative braking. | [8M] |

