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**PRESIDENCY UNIVERSITY
BENGALURU
SCHOOL OF ENGINEERING**

TEST – 1

Even Semester: 2018-19

Course Code: EEE 216

Course Name: Electric Power Utilization

Programme & Sem: B.Tech & VIII Sem (Group-I)

Date: 05 March 2019

Time: 1 Hour

Max Marks: 40

Weightage: 20%

Instructions:

- (i) Read the question properly and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and non-programmable calculators are permitted.

Part A

Answer **all** the Questions. **Each** question carries **four** marks. (3Qx4M=12)

- 1. What are the advantages of electric heating over other forms of heating?
- 2. Explain the properties of good heating element.
- 3. A resistance oven employing nichrome wire is to be operated from 220 V single-phase supply and is to be rated at 16 kW. If the temperature of the element is to be limited to 1,170°C and average temperature of the charge is 500°C, find the diameter and length of the element wire. Radiating efficiency = 0.57, Emissivity=0.9, Specific resistance of nichrome= (109×10^{-8}) ohm-m.

Part B

Answer **all** the Questions. **Each** question carries **eight** marks. (2Qx8M=16)

- 4. (a) The A slab of insulating material 150 cm² in area and 1 cm thick is to be heated by dielectric heating. The power required is 400 W at 30 MHz. Material has relative permittivity of 5 and p.f. of 0.05. Determine the necessary voltage. Absolute permittivity = 8.854×10^{-12} F/m. (4M)

(b) Explain the principle of dielectric heating. (4M)
- 5. a) Explain clearly the following: Luminous Flux, Luminous Intensity, illumination, MSCP, MHCP and solid angle. (4M)
b) Discuss the laws of illumination with suitable diagrams. (4M)

Part C

Answer the Question. Question carries **twelve** marks.

(1Qx12M=12)

6. a) With a neat sketch explain the working of an Indirect Resistance heating. (6M)
- b) Explain the working of the arc welding with suitable diagram (6M)

Part C

Answer the Question. **The** Question carries **twelve** marks.

(1Qx12M=12)

6. a) Explain the principle of operation of sodium vapor lamp and its advantages. (6M)
- b) For a quadrilateral speed-time curve of an electric train, derive expression for the distance between stops and speed at the end of the coasting period. (6M)

- b) A train runs between two stations 1.6 km apart at an average speed of 36 km/h. If the maximum speed is to be limited to 72 km/h, acceleration to 2.7 km/h/s, coasting retardation to 0.18 km/h/s and braking retardation to 3.2 km/h/s, compute the duration of acceleration, coasting and braking periods. Assume a simplified speed/time curve. (4M)
6. a) Explain the terms (i) tractive effort (ii) coefficient of adhesion (iii) specific energy consumption of train (iv) tractive resistance. (4M)
- b) For a quadrilateral speed-time curve of an electric train, derive expression for the distance between stops and speed at the end of the coasting period. (6M)
7. What are hybrid electric vehicles? Explain any one of the configurations with suitable block diagram. (10M)

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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

END TERM FINAL EXAMINATION

Even Semester: 2018-19

Course Code: EEE 216

Course Name: Electric Power Utilization

Program & Sem: B.Tech & VIII Sem (Group-I)

Date: 21 May 2019

Time: 3 Hours

Max Marks: 80

Weightage: 40%

Instructions:

- (i) Read the question properly and answer accordingly.
(ii) The question paper consists of 3 parts.
(iii) Scientific and Non-programmable calculators are permitted.

Part A

Answer **all** the Questions. **Each** question carries **one** marks.

(20Qx1M=20M)

1. Select the appropriate answer for the following multiple choice questions.

- i) In DCSP welding
(a) Electrode is the hottest (b) work piece is relatively cooled
(c) Base metal penetration is deep (d) heavily-coated electrodes are used.
- ii) Motor-generator set for D.C. arc welding has generator of
(a) series type (b) shunt type
(c) differentially compound type (d) level compound type
- iii) During resistance welding heat produced at the joint is proportional to
(a) $I^2 R$ (b) kVA (c) Current (d) Voltage
- iv) In D.C. arc welding
(a) electrode is made positive and workpiece negative
(b) electrode is made negative and workpiece positive
(c) both electrode as well as workpiece are made positive
(d) both electrode as well as workpiece are made negative
- v) For arc welding, D.C. is produced by which of the following?
(a) motor-generator set (b) regulator
(c) transformer (d) none of the above

- vi) The illumination at various points on a horizontal surface illuminated by the same source varies as
 (a) $\cos^3 \theta$ (b) $\cos \theta$ (c) $1/r^2$ (d) $\cos^2 \theta$
- vii) The function of capacitor across the supply to the fluorescent tube is primarily to
 (a) Stabilize the arc (b) reduce the starting current
 (c) Improve the supply power factor (d) reduce the noise
- viii) Magnetic materials are heated with the help of
 (a) Hysteresis loss (b) electric arc
 (c) electric current (d) radiation.
- ix) The main requirements of a good heating element used in a resistance furnaces are
 (a) High resistivity
 (b) high melting-temperature
 (c) positive resistance temperature coefficient
 (d) all of the above.
- x) Which of the following heating methods has maximum power factor?
 (a) Arc heating (b) Dielectric heating
 (c) Induction heating (d) Resistance heating
- xi) Which of the following methods of heating is not dependent on the frequency of supply?
 (a) Induction heating (b) Dielectric heating
 (c) Electric resistance heating (d) All of the above
- xii) Hysteresis loss and eddy current loss are used in
 (a) Induction heating of steel (b) dielectric heating
 (c) induction heating of brass (d) Resistance heating
- xiii) A mercury vapour lamp gives light.
 (a) white (b) pink (c) yellow (d) greenish blue
- xiv) The unit of illuminance is
 (a) lumen (b) cd/m^2 (c) lux (d) steradian
- xv) The speed/time curve for city service has no..... period.
 (a) coasting (b) free-running (c) acceleration (d) braking.
- xvi) For 25 kV single phase system power supply frequency is
 (a) 60 Hz (b) 50 Hz (c) 25 Hz (d) $16\frac{2}{3}$ Hz
- xvii) An ideal traction system should have
 (a) Easy speed control
 (b) high starting tractive effort

- (c) Equipment capable of withstanding large temporary loads
 (d) all of the above

- xviii) In electric discharge lamps for stabilizing the arc
 (a) a reactive choke is connected in series with the supply
 (b) a condenser is connected in series to the supply
 (c) a condenser is connected in parallel to the supply
 (d) a variable resistor is connected in the circuit
- xix) In electric traction if contact voltage exceeds 1500 V, current collection is invariably via a
 (a) contact rail (b) overhead wire (c) third rail (d) conductor rail.
- xx) The current collector that can be used at different speeds under all wind conditions and stiffness of OHE is calledcollector.
 (a) trolley (b) bow (c) pantograph (d) messenger.

Part B

Answer **all** the Questions. **Each** question carries **ten** marks. (3Qx10M=30M)

2. a) With a neat sketch explain the working of an Indirect Resistance heating. (5M)
 b) Explain the working of the arc welding with suitable diagram (5M)
3. a) Discuss the laws of illumination with suitable diagrams. (5M)
 b) The illumination in a drawing office 30 m × 10 m is to have a value of 300 lux and is to be provided by a number of 300-W filament lamps. If the coefficient of utilization is 0.4 and the depreciation factor 0.9, determine the number of lamps required. The luminous efficiency of each lamp is 14 lm/W. (5M)
4. a) Find the schedule speed of an electric train for a run of 1.5 km if the ratio of its maximum to average speed is 1.25. It has a braking retardation of 3.6 km/h/s, acceleration of 1.8 km/h/s and stop time of 21 second. Assume trapezoidal speed/time curve. (4M)
 b) With a neat sketch explain the working of a fluorescent lamp and list its advantages. (6M)

Part C

Answer **all** the Questions. **Each** question carries **ten** marks. (3Qx10M=30M)

5. a) What are the methods of electric braking of dc motors for traction. Briefly explain any one of them. (6M)