



SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code : UEE (13A02702)

Course & Branch: B.Tech - EEE

Year & Sem: IV-B.Tech & I-Sem

Regulation: R13

UNIT – I

ILLUMINATION

1. a) Draw and explain the operation of sodium vapour lamp with neat diagram and enumerate its advantages and disadvantages. 5M
 b) A lamp having a uniform cp of 100 in all direction is provided with a reflector which directs 60% of the light uniformly on to a circular area of 10m diameter. The lamp is hung 5m above the area. Calculate the illumination at the centre. 5M
2. a) State and explain laws of illumination. 5M
 b) Six lamps are used to illuminate a certain room. If the luminous efficiency of each lamp is 12 lumens/watt and the lamps have to emit a total lux of 10,000 lumens, calculate (i) The mean spherical luminous intensity (ii) The cost of energy consumed in 3 hours if the charge for electrical energy is 50 paise per unit. 5M
3. a) If a lamp of 200 cp is placed 1m below a plane mirror which reflects 90% of light falling on it, determine illumination at a point 3 m away from the foot of the lamp which is hung 4 m above ground. 4M
 b) Explain with sketch the principle and operation of incandescent lamp and enumerates its advantages and disadvantages. 6M
4. a) A 250 CP lamp is hung 4m above the centre of a circular area of 6m diameter. Calculate the illumination at the (i) Centre of area. (ii) Periphery of the area. (iii) Average illumination 5M
 b) Explain the various factors to be taken into account for designing schemes for.
 (i) Factory lighting
 (ii) Street lighting
5. A machine shop 40m×20m is to have an illumination of 160lux on working plane. The lamps are mounted on 6m above the working plane. Give the layout of a suitable installation.
 a) Using filament lamp. 10M
 b) Using 50 watts fluorescent lamp. Assume necessary data.
6. a) Write short notes on polar curves and explain the Rouseau's construction for calculating MSCP of lamp. 5M
 b) A filament lamp of 500W is suspended at a height of 4.5 m above the working plane and gives uniform illumination over an area of 6 m diameter. Assuming an efficiency of the reflector as 70% and efficiency of lamp as 0.8 watt per candle power, determine the illumination on the working plane 5M

7. State the laws of illumination. Explain the laws with the help of suitable diagrams and derive an equation of the same. 10M
8. a) A room measuring 30m×15m is to be illuminated by 10 lamps and the average illumination is to be 85 lux. Determine the MSCP of each lamp if the utilization and depreciation factors are 0.5 and 0.8 respectively. 5M
b) Briefly explain the requirement of good lighting scheme. 5M
9. a) Explain with sketch the principle and operation of fluorescent lamp 5M
b) Write short notes on flood lighting. 5M
10. a) Write short notes on source of light 2M
b) Define Mean spherical candle power 2M
c) Define lamp efficiency 2M
d) Define space-height ratio 2M
e) Write short notes on glare 2M

Prepared by: K. BABU

UNIT –II**ELECTRIC HEATING & WELDING**

1. a) Briefly discuss the method of Dielectric heating used in the electric heating. 5M
b) Briefly discuss the applications of resistance heating. 5M
2. a) Describe direct and indirect core type furnace with neat sketches 5M
b) Explain application of induction heating. 5M
3. a) What are the different types of heating? Write advantages of electric heating. 5M
b) A low frequency induction furnace whose secondary voltage is maintained constant at 10 volts, takes 400 kW at 0.6 pf, when the hearth is full. Assuming the resistance of the secondary to vary inversely as the height of the charge and reactance to remain constant, height up to which the hearth should be filled to obtain maximum heat. 5M
4. a) Discuss briefly about induction and dielectric heating process. 4M
b) A slab of insulating material 150 sq cm in area and 1 cm thick is to be heated by dielectric heating. The power required is 400 W at 30×10^6 cps. Materials has permittivity of 5 and power factor of 0.05. Determine voltage necessary. 6M
5. a) Write briefly about ultrasonic welding and defects in welding process. 5M
b) Differentiate between A.C and D.C welding. Discuss about the techniques used for arc welding. 5M
6. a) Briefly discuss the welding electrodes of various metals. 5M
b) Explain briefly the types of electric arc welding. 5M
7. Explain the different methods of electric welding and their relative advantages. 10M
8. Discuss the various applications of electrolysis in detail. 10M
9. a) Discuss the advantages of reverse current process of electro plating. 5M
b) Discuss faraday's laws and applications of electrolysis in detail. 5M
10. a) Write short notes on welding transformer characteristics. 2M
b) Explain Spot welding 2M
c) What are various modes of heat transfer? 2M
d) Name the materials commonly used for heating elements. 2M
e) What is electro-deposition? 2M

Prepared by: K. BABU

UNIT -III**ELECTRIC TRACTION - I**

1. a) Compare A.C traction with D.C traction with necessary examples. 5M
b) Explain about the different methods of electric braking systems in the case of traction. 5M
2. Discuss the characteristic features of a traction motor for effective traction systems. 10M
3. a) What are the special features of traction motors? 5M
b) A goods train weighing 300 tonnes is to be hauled by a locomotive up a gradient of 2% with an acceleration of 1 kmphs. Coefficient of adhesion is 20%. Track resistance = 45 W/Ton and effect of rotational masses is 15% of dead weight. If axle load is not to exceed by 20 tonnes, determine the weight of locomotive and number of axles. 5M
4. a) How the electric traction system is classified? Briefly discuss. 5M
b) A train has schedule speed of 30 km/hr over a level track distance between stations being 1 km. Duration of stop is 20 sec. assuming braking retardation of 3 km/hr/sec and maximum speed 25% greater than average speed, calculate acceleration required to run the service 5M
5. a) Write short notes on mechanism of train movement. 5M
b) What is coefficient of adhesion? How does it affect slipping of driving wheels of train unit? 5M
6. a) Explain the systems usually employed for track electrification. 5M
b) Explain the type of Rheostatic braking with relevant diagrams. 5M
7. Describe how plugging, rheostatic braking and regenerative braking are employed with DC series motor. 10M
8. a) What are the advantages of electric braking? 5M
b) A 400 tonne goods train is to be hauled by a locomotive up a gradient of 2% with acceleration of 1 km/hr/sec, coefficient of adhesion 20%, track resistance 40 newtons/tonne and effective rotating masses 10% of the dead weight. Find the weight of the locomotive and the number of axles if the axle load is not to increase beyond 22 tonnes. 5M
9. Derive the relationship between tractive effort, gearing efficiency, gear ratio and driving wheel diameter of an electric train. 10M
10. a) Write short notes on adhesive weight. 2M
b) What is electric traction? 2M
c) Name the different systems of traction. 2M
d) Why A.C. series motors used for traction services are designed to operate at low frequency i.e., $16\frac{2}{3}$ Hz or 25 Hz. 2M
e) What is main disadvantage of electric traction. 2M

Prepared by: K. BABU

UNIT -IV**ELECTRIC TRACTION - II**

1. a) Explain the calculations of tractive effort. 3M
 b) Write a short note on specific energy consumption. 3M
 c) Explain about effect of varying acceleration and braking retardation in the electric traction systems. 4M
2. An electric train has an average speed of 42 km/hr on a level track between stops 1400 m apart. It is accelerated at 1.7 km/hr/sec and it is braked at 3.3 km/hr/sec. Draw the speed-time curve and estimate the specific energy consumption. Assume tractive resistance as 50 NW/Tonne and allow 10% rotational inertia. 10M
3. a) Write short notes on specific energy consumption. 5M
 b) What do you understand by the specific energy consumption and what factors affect the specific energy consumption. 5M
4. a) The tractive effort for propulsion of a train on level track. 5M
 b) The tractive effort for propulsion of a train up and down a gradient. 5M
5. A train is to run between two stations 1.6 km apart at an average speed of 40 kmph, the run is to be made to a quadrilateral N-T curve. Maximum speed is to be limited to 64 kmph, acceleration, to 2 kmphps, coasting retardation to 0.16, and braking retardation to 3.2, determine the duration of a acceleration, coasting and braking periods. 10M
6. a) Discuss the speed-time curves for main line services. 4M
 b) A train has schedule speed of 60 km/hr between the stops which are 6 km apart. Determine the crest speed over the run assuming trapezoidal speed time curve. The train accelerates at 2 km/hr/sec and retards at 3 km/hr/sec. Duration of stops is 60 sec. 6M
7. a) Discuss the speed-time curves for urban service. 4M
 b) A sub urban electric train has a maximum speed of 70 km/hr. The schedule speed including a station stop of 30 sec in 45 km/hr. If the acceleration is 1.5 km/hr/sec. Find the value of retardation when the average distance stops is 6 m. 6M
8. What is coefficient of adhesion? How the value of coefficient of adhesion affects the slipping and skidding of the driving wheels of traction unit? 10M
9. An electric train is to have acceleration and breaking retardation of 0.8 km/hr/sec and 3.2 km/hr/sec respectively. If the ratio of maximum to average speed is 1.3 and time for stop is 26 sec, find the schedule speed for a run of 1.5 km. Assume simplified trapezoidal speed time curve. 10M
10. With the help of Speed-Time curve, define and explain the importance of following factors in a traction system.
 - a. Notching period. 2M
 - b. Free running period. 2M
 - c. Accelerating period. 2M
 - d. Coasting period. 2M
 - e. Braking period. 2M

Prepared by: K. BABU

UNIT -V**ECONOMIC ASPECTS OF UTILISING ELECTRICAL ENERGY**

1. a) What do you understand by power factor? Give the disadvantages of poor power factor. 5M
b) What are the advantages of improved power factor? 5M
2. a) Explain with a neat sketch the function of an economizer. 5M
b) List at least five applications of heat pipes. 5M
3. a) What are waste heat recovery boilers? Explain the need and benefits. 5M
b) Explain any three types of 'recuperators'. 5M
4. a) What are the technical aspects of energy efficient motors? 5M
b) Explain the functions and benefits of demand controller 5M
5. a) How can the power generation cost be reduced? 5M
b) A 400v, 3- phase installation drawn a current of 50 A at 0.8 lagging p.f. It is desired to install a synchronous motor to improve the overall power factor to 0.95 lagging. The synchronous motor will drive a 25 H.P. (metric) load at an efficiency of 0.9 calculate:
(i) The KVA of the synchronous motor.
(ii) The power factor of the motor. 5M
6. a) A generating station has a connected load of 50 MW and a maximum demand of 25 MW the unit generated being 61.5×10^6 per annum. Calculate demand factor and load factor. 5M
b) List the essential components of a diesel power plant and explain them briefly. 5M
7. a) Write short notes on pit head generation. 5M
b) Explain about use of private generating plant. 5M
8. A supply has to be provided for a factory having a maximum load of 250 KW and an annual load factor of 40%. Compare the cost of providing this from (a) Public supply at 11KV. Having a tariff of Rs: 120 per KW+4 paise per unit. (b) a diesel plant costing Rs: 360 per KW and having a running cost for fuel and oil of 6 paise per unit generated 10M
9. a) Discuss the role of load factor on the cost of electrical energy. 5M
b) What are the causes of low power factor in power system? Name the devices used to improve the power factor. 5M
10. a) What is the principle of regenerators? 2M
b) Give three examples of low temperature air to air heat recovery device. 2M
c) List various energy efficient lighting controls. 2M
d) Define the load factor. 2M
e) Define the demand factor. 2M

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UNIT – I

ILLUMINATION

1. Which of the following statements is correct? []
A) Light is a form of heat energy B) Light is a form of electrical energy
C) Light consists of shooting particles D) Light consists of electromagnetic waves
2. Candela is the unit of which of the following? []
A) wave length B) luminous intensity C) Luminous flux D) Frequency
3. Colour of light depends upon []
A) Frequency B) Wave length C) Both A and B D) Speed of light
4. Luminous efficiency of fluorescent tubes is []
A) 10 lumens/watt B) 20 lumens/watt C) 40 lumens/watt D) 60 lumens/watt
5. Solid angle is expressed in terms of ----- []
A) Radians/meter B) radian C) degree D) steradians
6. The unit of luminous flux is ----- []
A) watt/m² B) lumens C) lumens/m² D) watt
7. A mercury vapour lamp gives ----- light. []
A) White B) Pink C) Yellow D) Greenish blue.
8. Glare is reduced by []
A) Using diffusers B) Increasing the height of the lamp
C) Using reflectors to cut-off the at certain angle D) all of the above
9. The colour of sodium vapour discharge lamp is []
A) Red B) Pink C) Yellow D) Greenish blue.
10. A reflector is provided to []
A) Protect the lamp B) Provide better illumination
C) Avoid glare D) all of the above
11. 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.
12. Illumination of one lumen per sq. meter is called----- []
A) Lumen meter B) Lux C) Foot candle D) Candle
13. ----- Will need lowest level of illumination. []
A) Auditorium B) Railway platform C) Displays D) Fine engravings.
14. Due to moonlight, illumination is nearly []
A) 3000 lumens/m² B) 300 lumens/m² C) 30 lumens/m² D) 0.3 lumens/m²
15. The purpose of coating the fluorescent tube from inside with white powder is []
A) To improve its life
B) To change the colour of light emitted to white

- C) To improve the appearance
D) To increase the light radiations due to secondary emission
16. A mercury vapour lamp gives ----- light. []
A) White B) Pink C) Yellow D) Greenish blue.
17. The illumination at various points on horizontal surface illuminated by the same source varies as. []
A) $\text{COS}^3 \theta$ B) $\text{COS } \theta$ C) $1/r^2$ D) $\text{COS}^2 \theta$
- 18). The M.S.C.P. of a lamp which gives out a total luminous flux of 400 JI ---- candela. []
A) 200 B) 100 C) 50 D) 40
- 19). The direct lighting scheme is most efficient but is liable to cause. []
A) monotony B) glare C) hard shadows D) Both (B) and (C)
- 20). Total flux required in lighting scheme depends inversely on []
A) Illumination B) Surface area C) Utilization factor D) Space/height ratio.
- 21). The average working life of a fluorescent lamp is about ----- hours. []
A) 1000 B) 4000 C) 3000 D) 5000
- 22). The luminous efficiency of a sodium vapour lamp is about ----- lumen/watt []
A) 10 B) 30 C) 50 D) 70
- 23). ----- will need lowest level of illumination. []
A) Auditoriums B) Railway platform C) Displays D) Fine engravings
- 24). In electrical discharge lamps light is produced by []
A) Cathode ray emission B) Ionization in a gas or vapour
C) Heating effect of current D) Magnetic effect of current
- 25). For normal reading the illumination level required is around []
A) 20 – 40 lumens/m² B) 60 – 100 lumens/m²
C) 200 – 300 lumens/m² D) 400 – 500 lumens/m²
- 26). A substance which change its electrical resistance when illuminated by light is called.[]
A) Photoelectric B) Photovoltaic C) Photo conductive D) None of the above
- 27) ----- is a cold cathode lamp. []
A) Fluorescent lamp B) Neon lamp
C) Mercury vapour lamp D) Sodium vapour lamp
- 28). For precision work the illumination level required is of the order of []
A) 500 – 1000 lumens/m² B) 200 – 2000 lumens/m²
C) 50 – 100 lumens/m² D) 10 – 25 lumens/m²
- 29). The tungsten filament lamps when compared with fluorescent tubes have all the following Advantages except.
A) Simple installation B) Long life
C) Less costly D) More brightness.
- 30). Incandescent lamps, coiled coil filaments are used for []
A) Coloured lamps B) Higher wattage lamps
C) Gas filled lamps D) Low wattage lamps
- 31). Soft shadows are produced by []
A) Using surface source of light instead of point source of light.
B) Increasing the number of lamps
C) Both A and B

- D) None of the above
- 32). Which of the following is present inside the fluorescent tube? []
A) Argon and neon B) Argon and CO₂ C) Mercury vapour D) Helium and oxygen
- 33). Which of the following bulb operates on least power? []
A) GLS bulb B) Torch bulb C) Neon bulb D) Night bulb
- 34). In case of ----- least illumination level is required. []
A) Skilled bench work B) Drawing offices C) Hospital wards D) Fine machine work.
- 35). ----- does not have separate choke . []
A) Sodium vapour lamp B) Fluorescent lamp C) Mercury vapour lamp D) All the above.
- 36). Most affected parameter of a filament lamp due to voltage change is []
A) Wattage B) life C) Luminous efficiency D) Light output
- 37). The luminous flux is []
A) The light energy radiated by sun
B) The part of light energy, radiated by sun, which is received on the earth
C) The rate of energy radiation in the form of light waves
D) None of the above
- 38). Co-efficient of utilization depends upon----- []
A) Colour of the wall B) Colour of ceiling C) Size the room D) All the above
- 39). The gas filled in vacuum filament lamp is []
A) Nitrogen B) Argon C) Air D) None
- 40). ----- cannot sustain much voltage fluctuations. []
A) Sodium vapour lamp B) Mercury vapour lamp
C) Incandescent lamp D) Fluorescent lamp

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UNIT –II**ELECTRIC HEATING & WELDING**

1. Which of the following is an advantage of electricity? []
A) Quicker operation B) Higher efficiency C) Absence of flue gases D) All of the above
2. ----- method has leading power factor []
A) Resistance heating B) Dielectric heating C) Arc heating D) Induction heating
3. Which of the following methods is used to control temperature in resistance furnaces []
A) Variation of resistance B) Variation of voltage
C) Periodical switching on and off the supply D) All of the above methods.
4. Radiations from a black body are proportional to []
A) T B) T² C) T³ D) T⁴
5. In the indirect resistance heating method, maximum heat-transfer takes place by []
A) Radiation B) Convection C) Conduction D) Any of the above
6. Induction furnaces are employed for which of the following? []
A) Heat treatment of castings B) Heating of insulators
C) Melting of aluminum D) None of the above.
7. In resistance heating highest working temperature is obtained from heating elements made of ----- []
A) Nickel copper B) Nichrome C) Silicon carbide D) Silver
8. As compare to other methods of heating using gas and coal etc, electric heating is far superior because of its. []
A) Cleanliness B) Ease of control C) Higher efficiency D) All the above
9. Magnetic materials are heated with the help of []
A) Hysteresis loss B) Electric arc C) electric current D) radiation
10. 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 the above
11. ----- has the highest value of thermal conductivity. []
A) Copper B) Aluminum C) Brass D) Steel
12. When a body reflects entire radiation incident on it, then it is known as: []
A) White body B) Grey body C) Black body D) Transparent body
13. Induction heating ----- is abnormally high []
A) Phase angle B) Frequency C) Current D) Voltage.
14. In direct arc furnace, which of the following has high value? []
A) Current B) Voltage C) Power factor D) All the above
15. For intermittent work which of the following furnaces is suitable? []
A) Radiation B) Convection C) Conduction D) any of the above
16. ----- is used for heating non-conducting materials. []
A) Eddy current heating B) Arc heating C) Induction heating D) Dielectric heating
17. In an electric room heat convector the method of heating used is []
A) Arc heating B) Resistance heating C) Induction heating D) Dielectric heating
18. During resistance welding heat produced at the joint is proportional to []
A) I²R B) KVA C) Current D) Voltage
19. The metal surfaces, for electric resistance welding must be ----- []
A) Lubricated B) cleaned C) moistened D) rough.
20. In arc welding major personal hazards are []

- A) Flying sparks
C) Harmful infrared and ultra-violet rays from the arc
- B) Weld spatter
D) all the above
21. For the arc welding current range is usually []
A) 10 – 15A B) 30 – 40A C) 50 – 100A D) 100 – 350 A
22. In ultrasonic welding the frequency range is generally. []
A) 2000 to 3000 Hz B) 4000 to 20000 Hz
C) 30000 to 40000 Hz D) 50000 to 80000 Hz
23. Which of the following equipment is generally used for arc welding? []
A) Single phase alternator B) Two phase alternator
C) Three phase alternator D) Transformer.
24. Resistance welding cannot be used for []
A) Dielectric B) Ferrous material C) Non-ferrous material D) Any of the above
25. In spot welding composition and thickness of the base metal decides []
A) The amount of squeeze pressure B) Hold time
C) The amount of weld current D) All above
26. Helium produces which of the following? []
A) Deeper penetration B) Faster welding speeds
C) Narrower heat affected zone in base metal D) None of the above.
27. Due to which of the following reasons aluminum is difficult to weld? []
A) It has an oxide coating B) It conducts away heat very rapidly
C) Both A & B D) None of the above.
28. Electric arc welding process produces temperature up to []
A) 1000°C B) 1500°C C) 3500°C D) 5550°C
29. During spot welding the current flows for []
A) Fraction of a minute to several minutes B) Fraction of a second to several seconds
C) Few milliseconds D) Few microseconds.
30. During carbon arc welding []
A) Electrodes is connected to neutral if A.C. is used
B) Electrode is not connected to any voltage source when A.C. is used
C) Electrode is negative with respect to the work if D.C. is used.
D) Electrode is positive with respect to the work if D.C. is used.
31. The purpose of coating on arc welding electrodes is to []
A) Stabilize the arc B) Provide a protecting atmosphere
C) Provide slag to protect the molten metal D) All the above
32. the processes based on the fact that electrical energy can produce chemical changes are called ----- Processes. []
A) Electrolytic B) Magnetic C) Electrostatic D) None of this
33. Faraday's ----- law states that the mass of a substance liberated from an electrolyte in a given Time is proportional to the quantity of electricity passing through the electrolyte. []
A) Second B) First C) Both A & B D) None of this
34. In the process of electroplating the circuitry involved is []
A) Polarized B) Non-Polarized
C) Depends upon nature of plating D) None of above
35. The existence of a counter electrode is observed some where is the []
A) Plating vats B) Electro-chemical cleaning baths
C) D.C supply sources D) Nothing as above is connected with the plating system
36. The capacitor bank installed in the rectifier system of any electroplating

- Plant is meant for []
- A) Smoothing the effects of loads variation
 - B) Minimizing the ripple content of the D.C. supply
 - C) To improve power factor and line regulation of the mains feeding the rectifier system
 - D) All as above
37. Spongy coating of electroplating speaks of []
- A) Under current density
 - B) Over current density
 - C) Excessive electrolyte density
 - D) Poorer electrolyte density
38. The metal being deposited is available in form of []
- A) Constituent of electrolyte
 - B) One of the electrodes
 - C) Both as above
 - D) None out of above
39. Chrome plating done as []
- A) Primary layer
 - B) Secondary layer
 - C) Tertiary layer
 - D) None
40. Polarization on cathode surface can be checked through []
- A) Limiting current magnitude
 - B) Agitation of electrolyte
 - C) Periodical reverse plating
 - D) All as above

Prepared by: K. BABU

- A) 60 kmph B) 75 kmph C) 100 kmph D) More than 100 kmph
22. Which of the following state capitals is not on broad gauge track? []
 A) Lucknow B) Bhopal C) Jaipur D) Chandigarh
23. Which of the following is the advantage of electric braking? []
 A) It avoids wear of track B) Motor continues to remain loaded during braking
 C) It is instantaneous D) More heat is generated during braking
24. Which of the following braking systems on the locomotives is costly? []
 A) Regenerative braking on electric locomotives B) Vacuum braking on diesel locomotives
 C) Vacuum braking on steam locomotives D) All braking systems are equally costly
25. For given maximum axle load tractive efforts of A.C locomotive will be []
 A) Less than that of D.C. locomotive B) More than that of D.C locomotive
 C) Equal to that of D.C. locomotive D) None of the above
26. Co-efficient of adhesion reduces due to the presence of which of the following? []
 A) Sand on rails B) Dew on rails C) Oil on the rail D) Both (B) and (C)
27. Co-efficient of adhesion is []
 A) High in case D.C. traction than in the case of A.C. traction
 B) Low in case D.C. traction than in the case of A.C. traction
 C) Equal in both A.C and D.C. traction
 D) Any of the above
28. The rate of acceleration on Suburban or urban services is restricted by the Consideration of []
 A) Engine power B) Track curve C) Passenger discomfort D) Track size
29. The friction at the track is proportion to []
 A) $1/\text{speed}$ B) $1/(\text{speed})^2$ C) Speed D) None of the above
30. The air resistance to the movement of the train is proportion to []
 A) speed B) $(\text{speed})^2$ C) $(\text{Speed})^3$ D) $1/\text{speed}$
31. The normal value of adhesive friction is []
 A) 0.12 B) 0.25 C) 0.40 D) 0.70
32. The pulsating torque exerted by steam locomotives causes which of the following? []
 A) Jolting and skidding B) Hammer blow C) Pinching D) All the above
33. Which of the following braking system is used on steam locomotives? []
 A) Hydraulic system B) Pneumatic system C) Vacuum system D) None of the above
34. Vacuum is created by which of the following []
 A) Vacuum pump B) Ejector C) Any of the above D) None of the above
35. The resistance encountered by a train in motion is on account of []
 A) Resistance offered by air B) Friction at the track
 C) Friction at various part of the rolling stock D) All of the above
36. Battery operated trucks are used in []
 A) Steel mills B) Power station
 C) Narrow gauge traction D) factories for material transportation
37. ----- method can bring the locomotive to dead stop []
 A) Plugging braking B) Rheostat braking C) Regenerative braking D) None of the above
38. The values of co-efficient of adhesion will be high when rails are []
 A) Greased B) Wet C) Sprayed with oil D) Cleaned with sand
39. The number of passenger coaches that can be attached to a diesel engine locomotive on broad gauge is usually restricted to []
 A) 5 B) 10 C) 14 D) 17
40. The voltage used for suburban trains in D.C. system is usually []
 A) 12V B) 24V C) 220V D) 600 to 750 V

Prepared by: K. BABU

UNIT -IV**ELECTRIC TRACTION - II**

1. Area under the speed time curve represents []
 A) Total distance traveled B) Average speed
 C) Average acceleration D) None of the above is true
2. The speed of train estimated taking in to account the stoppage time at a station in addition to the Actual running time between stop is called the _____ speed. []
 A) Average B) Schedule C) Free running D) Notching
3. The average speed of a train is independent of []
 A) Duration of stop B) Acceleration and braking retardation
 C) Distance between stops D) Running time
4. The schedule speed of a given train when running in a given service (with given distance between Stations) is affected by []
 A) Acceleration and braking retardation B) Maximum (or) crest speed
 C) Duration of stop D) All of above
5. Skidding of a vehicle always occurs when []
 A) Braking effort exceeds its adhesive B) Brake is applied suddenly
 C) It negotiates a curve D) It passes over point and crossing
6. The speed time curve for urban services has no []
 A) Coasting period B) Free running period
 C) Braking period D) Acceleration period
7. Free running and coasting periods are generally long in case of []
 A) City service B) Sub urban service
 C) Main line service D) Outer sub urban service
8. In sub urban services as compared to urban services []
 A) The coasting period is longer
 B) The coasting period is smaller but free running period is longer
 C) The coasting and free running periods are smaller
 D) None of the above is true
9. Trapezoidal speed time curve pertains of which of the following services []
 A) Main line service B) Urban service C) Sub urban service D) Urban/sub urban service
10. Quadrilateral speed time curve is the close approximation for []
 A) Urban service B) Sub urban service C) Urban/sub urban service D) Main line service
11. A typical active load is []
 A) Hoist B) Blower C) Pump D) Lathe
12. An elevator drive is required []
 A) One quadrant B) Two quadrants C) Three quadrants D) Four quadrants
13. The basic element of an electric drives are []
 A) Electric motors and transmission system
 B) Electric motors, transmission and control system
 C) Transmission and control system
 D) Electric motors and conversion equipment
14. A DC series motor is used for an over hauling load. It can work stably if []
 A) The armature is shunted by a resistor B) The field winding is reverse
 C) A resistor is put in series with a machine D) A diverter is put across the field
15. Which motor should not be used for centrifugal pumps? []
 A) Shunt B) Series

- A) Electrical – Pneumatic
C) Hydro – Mechanical
- B) Mechanical – Electrical
D) Hydro – Mechanical
33. If the co-efficient of adhesion on dry rails is 0.26, which of the following could be the value for wet rails? []
A) 0.3 B) 0.26 C) 0.225 D) 0.16
34. ----- watt – hours per tonne km is usually the specific energy consumption for suburban seivces. []
A) 15 – 20 B) 50 – 75 C) 120 – 150 D) 160 – 200
35. The braking retardation is usually in the range []
A) 0. 15 to 0.30 kmphps B) 0.30 to 0.6 kmphps C) 0.6 to 2.4 kmphps D) 3 to 5 kmphps
36. Automatic signaling is used for which of the following trains? []
A) Mail and express train B) Superfast train
C) Suburban and urban electric train D) All trains
37. Quadrilateral, speed- time curve pertains to which of the following services? []
A) Main line services B) Urban services
C) Suburban services D) Urban and Suburban services
38. For three – phase induction motors which of the following is the least efficient method of speed control? []
A) Cascade control B) Pole changing
C) Rheostat control D) Combination of cascade and pole changing
39. Specific energy consumption becomes []
A) More on stepper gradient B) More with high train resistance
C) Less if distance between stops is more D) All the above
40. The return circuit for train cars is through ----- []
A) Neutral wire B) Rail C) Cables D) Common earthing

Prepared by: K. BABU

UNIT -V**ECONOMIC ASPECTS OF UTILISING ELECTRICAL ENERGY**

1. Maximum demand controller is used to ----- []
 - A) Switch off essential loads in a logical sequence
 - B) Exceed the demand of the plant
 - C) Switch off non-essential loads in a logical sequence
 - D) Controls the power factor of the plant
2. Capacitors with automatic power factor controller when installed in a plant: []
 - A) Reduces active power drawn from grid
 - B) Reduces the reactive power drawn from grid
 - C) Reduces the voltage of the plant
 - D) Increases the load current of the plant
3. _____ controls the power factor of the installation by giving signals to switch on or off power factor correction capacitors. []
 - A) KILOVAR
 - B) Automatic power factor control relay
 - C) Intelligent power factor controller
 - D) Maximum demand controller
4. _____ determines the rating of capacitance connected in each step during the first hour of its operation and stores them in memory. []
 - A) Maximum demand controller
 - B) Intelligent power factor controller
 - C) Automatic power factor controller
 - D) KILOVAR
5. The following function cannot be achieved with automatic power factor controllers. []
 - A) Voltage control
 - B) KILOVAR control
 - C) kW control
 - D) PF control
6. The following features apply to energy efficient motors by design: []
 - A) Energy efficient motors last longer
 - B) Starting torque for efficient motors may be lower than for standard motors
 - C) Both (A) and (B)
 - D) None
7. Eddy current drive can be a retrofit for _____. []
 - A) Constant speed system requirement
 - B) Variable speed system requirement
 - C) Dual speed system requirement only
 - D) None of the above
8. Electronic variable frequency drive (VFD) connected to motors:
 - A) Provide variable speed with high efficiency
 - B) Induces eddy-current in the secondary member of the clutch mechanism
 - C) Is not suitable for variable torque load
 - D) Does not provide variable speed and has low-efficiency
9. Variable speed cannot be obtained with _____. []
 - A) DC motors controller
 - B) AC motor controller
 - C) Soft starter controller
 - D) AC & DC controllers
10. Energy savings potential of variable torque applications compared to constant torque application is: []
 - A) Higher
 - B) Lower
 - B) Equal
 - D) None of the above
11. As an energy efficient application, slip power recovery system fits well for _____. []
 - A) Squirrel cage and slip ring motors
 - B) DC motor
 - C) Slip ring motors only
 - D) None of the above
12. Energy efficient transformer core is made up of _____. []
 - A) Silicon alloyed iron (grain oriented)
 - B) Copper

- C) Amorphous core - metallic glass alloy D) None of the above
13. The basic functions of electronic ballast excludes one of the following: []
 A) To ignite the lamp B) To stabilize the gas discharge
 C) To reduce lumen output of the lamp D) To supply power to the lamp
14. Select the application of fluid coupling fitting from the following: []
 A) Acts as a voltage limiter B) Enables no-load start-up of prime-mover
 C) Works on the principle of eddy current D) None of the above
15. The characteristic of conventional ballast in lighting application is one among the following []
 A) They have low operational losses than electronic ballasts.
 B) They have tuned circuit to deliver power at 25 Hz
 C) They do not require a mechanical switch (starter)
 D) They have high operational losses and high temperature rise
16. Application of occupancy sensors is well suited for _____. []
 A) Day light based controllers B) Night based controllers
 C) Motor controllers D) Movement or noise detector in room space
17. Find the odd retrofit group from the following []
 A) Occupancy sensors B) Timer based control
 C) Photo sensors D) Capacitor based control
18. Application of timers as a retrofit will assist in saving energy in areas of _____. []
 A) Lighting & motors B) Transformers C) HV- Feeder Panels D) All the above
19. Electronic soft starters are used for motors to []
 A) Achieve variable speed B) Provide smooth start and stops
 C) Improve the loading D) None of the above
20. Energy efficient lighting can be planned by using the following retrofits. []
 A) Photo-sensor B) Timer C) Occupancy sensor D) Localized switching
21. Which of the following power plants is the least reliable []
 A) Wind B) Tidal C) Geothermal D) Diesel
22. Which of the following power plants is the least reliable []
 A) Wind B) Hydro-electric C) Steam D) Diesel
23. Major advantage of waste heat recovery in industry is []
 A) Reduction in pollution B) Increase in efficiency
 C) Both A & B D) None of the above
24. Heat recovery equipment will be most effective when the temperature of flue gas is []
 A) 250 °C B) 200 °C C) 400 °C D) 280 °C
25. The waste gases coming out from gas turbine exhausts are of the order of []
 A) 370-540 B) 450 – 700 C) 700-800 D) 250-440
26. Recuperator is used mainly as a waste heat recovery system in a _____. []
 A) Boiler B) Billet Reheating Furnace
 C) Compressor D) None of the above
27. Recuperator will be more efficient if the flow path of hot and cold fluids is in []
 A) Co-current mode B) Counter current mode
 C) Cross current mode D) None of the above
28. Economizer is provided to utilize the flue gas heat for ____ []
 A) Preheating the boiler feed water B) Preheating the stock
 C) Preheating the combustion air D) Preheating fuel
29. A diesel power plant is best suited as []
 A) Base load plant B) Stand-by-plant C) Peak load plant D) General purpose plant
30. The efficiency is secondary consideration in case of []
 A) Peak load plant B) Base load plant C) Both (A) and (B) D) None of the above

