

*OBJECTIVE QUESTION BANK
FOR
GENERAL SERVICES*

QUALITY POLICY

"To develop safe, modern and cost effective Railway Technology complying with Statutory and Regulatory requirements, through excellence in Research, Designs and Standards and Continual improvements in Quality Management System to cater to growing demand of passenger and freight traffic on the railways".

CONTENTS

Item No.	Description	Page No.
	<i>Foreword</i>	<i>iii</i>
	<i>Preface</i>	<i>iv</i>
	<i>Contents</i>	<i>v</i>
	<i>Correction Slip</i>	<i>vi</i>
1.	GENERAL ELECTRICAL ENGINEERING	01
2.	TRANSFORMERS	20
3.	EARTHING	27
4.	LIGHTING AND ILLUMINATION	29
5.	D.G. SET	34
6.	PUMP	38
7.	TRACK CROSSING	44
8.	INDIAN ELECTRICITY RULES	48
9.	POLICY	50
10.	ELECTRICAL UNITS: EQUIVALENTS & FORMULAE	54
11.	INDUCTION MOTOR	56
12.	CABLES	62
13.	ANSWER SHEET	64
14.	REFERENCE	67

1. GENERAL ELECTRICAL ENGINEERING

1. For the protection of single-phase 1.5 kW motor, a MCB of rating should be provided
 - (a) 10 A
 - (b) 16 A
 - (c) 32 A
 - (d) 63 A
2. The low power factor results in
 - (a) Increased losses
 - (b) Decreased losses
 - (c) No effect on losses
 - (d) Better generating efficiency
3. Low power factor
 - (a) Aids the voltage regulation
 - (b) Increase the voltage regulation
 - (c) Decrease the voltage regulation
 - (d) None of the above
4. The power factor of the AC supply can be improved by using
 - (a) Synchronous generator
 - (b) Universal motor
 - (c) Synchronous condenser
 - (d) SCR
5. A distribution line of 440 V is classified as
 - (a) LV
 - (b) MV
 - (c) HV
 - (d) EHV
6. Which of the following is not used as a overhead conductor
 - (a) ACSR
 - (b) Weasel
 - (b) PILCA
 - (d) Zebra
7. Which of the following reduces the power factor
 - (a) Motor on no load
 - (b) Tube lights
 - (c) Fans
 - (d) All of the above
8. Under high voltage test cable shall withstand an AC voltage of
 - (a) 1.5 kV
 - (b) 3 kV
 - (c) 5.2 kV
 - (d) 7.2 kV
9. Under high voltage test cable shall withstand a DC voltage of
 - (a) 1.5 kV
 - (b) 3 kV
 - (c) 5.2 kV
 - (d) 7.2 kV
10. Under water immersion test cable is immersed in a water bath at
 - (a) 40 deg C
 - (b) 50 deg C
 - (c) 60 deg C
 - (d) 70 deg C

11. For water immersion test, cable is immersed in hot water at specified temperature, after 24 hrs the voltage applied between conductor and water for five minutes is
(a) 3 kV (b) 4 kV
(c) 5 kV (d) 6 kV
12. Unit of energy is
a) Kilo volt hours b) Kilo watt hours c) Kilo watt
13. As per Ohm's law
a) $V = IR$ b) $V = I/R$ c) $R = V \times I$
14. Unit of resistance is
a) Ampere b) Volts c) Ohm
15. In three phase 415 volts 50 Hz supply, the phase to phase voltage is
a) 220 Volts b) 415 volts c) 440 volts
16. In three phase 415 volts 50 Hz supply, the phase to neutral voltage is
a) 220 volts b) 230 volts c) 440 volts
17. In 4 sq. mm PVC wire, 4 sq. mm stand for
a) Thickness of wire
b) Length of wire
c) The area of thickness of wire
18. The instrument to measure the light is called
a) Tong tester b) Lux meter c) Micro meter
19. 10 hours use of 500 watt lamp will consume the energy
a) 10 units b) 20 units c) 5 units
20. No. of poles in MCB/TPN is
a) 2 poles b) 4 poles c) 3 poles
21. A.C. is converted into D.C. by
a) Dynamo b) Motor.
c) Transformer d) Rectifier
22. Farad is a unit of
a) Flux b) Capacitance
c) Mutual inductance d) Resistance of a conductor
23. A kilowatt-hour is a unit of
a) Energy b) Electrical potential
c) Power d) Electric current

24. An electric lamp is marked 100 watt. It is working on 200 Volts. The current through the lamp is given as
- 0.5 Amp.
 - 0.2 Amp.
 - 5.0 Amp.
 - 1.0 Amp.
25. Before carrying out O/H maintenance following is due
- Transformer is switched off
 - DG set is switched off
 - HT panel is switched off
 - Respective O/H feeder is switched off or earthed
26. In house wiring the red wire indicates the
- | | |
|----------------|----------------|
| (a) Phase | (b) Neutral |
| (c) Earth wire | (d) Dead wire. |
27. In house wiring the black wire indicates the
- | | |
|----------------|---------------|
| (a) Phase | (b) Neutral |
| (c) Earth wire | (d) Dead wire |
28. In house wiring the green wire indicates the
- | | |
|----------------|----------------|
| (a) Phase | (b) Neutral |
| (c) Earth wire | (d) Dead wire. |
29. In 4 wire electric circuit, the black conductor is used for
- | | |
|----------------|-------------|
| (a) Phase | (b) Neutral |
| (c) Earth wire | (d) Armour |
30. In cabling system the earth is connected with conductor having colour
- | | |
|------------|------------|
| (a) Red | (b) blue |
| (c) yellow | (d) Armour |
31. Unit of current is
- | | |
|----------|------------|
| (a) Watt | (b) Ampere |
| (c) Volt | (d) ohm |
32. Heater element is made up of
- | | |
|------------|---------------|
| (a) Tin | (b) Nichrome |
| (c) Silver | (d) Any above |
33. Filament of incandescent lamp is made of
- | | |
|---------------|--------------|
| (a) Tin | (b) Nichrome |
| (c) Tungusten | (d) Silver |

34. An insulator should have
(a) High resistance (b) High conductance
(c) High conductivity (d) All of the above
35. Which of the following is used to make electric connections
(a) Solder (b) PG clamp
(c) Thimbles (d) All above
36. Instrument used for measuring the speed of rotating machines/ appliances is
(a) Lux meter (b) Tachometer
(c) Micrometer (d) None above
37. Instrument used for measuring the thickness of wire/strip is
(a) Lux meter (b) Tachometer
(c) Micrometer (d) None above
38. Instrument used for measuring the voltage across a circuit is
(a) Ammeter (b) voltmeter
(c) Thermometer (d) None above
39. Instrument used for measuring the current is
(a) Ammeter (b) voltmeter
(c) Thermometer (d) None above
40. Instrument used for measuring the temperature is
(a) Ammeter (b) voltmeter
(c) Thermometer (d) None above
41. Illumination level is measured in terms of
(a) Lux (b) Volt
(c) Ampere (d) Ohm
42. Insulating resistance is measured by using
(a) Multimeter (b) Megger
(c) Voltmeter (d) Hydrometer
43. Which of the following is used for rectification of AC supply
(a) Diodes (b) Transistors
(c) Capacitor (d) Resistors
44. Which preparation should be done starting a new wiring
(a) Prepare a wiring diagram
(b) Prepare for shock treatment
(c) Both a & b
(d) None of the above

- 45 In wiring circuit the fuse will be placed on
(a) Phase (b) Neutral
(c) Earth (d) Any of the above
- 46 Which of the following tests should be done before connecting a wiring to the main line
(a) IR test (b) Continuity test
(c) Polarity test (d) Any above
- 47 Which of the following is a common wiring fault
(a) Short circuit (b) Open circuit
(c) Fuse blown (d) All above
- 48 Wattage rating range of electric kettle is
(a) 50-500 W (b) 350-1000 W
(c) 1000-1500 W (d) 1200-1600 W
- 49 Device used for auto off an electric iron is
(a) Thermostat switch (b) Overload relay
(c) Time delay switch (d) Any of the above
- 50 Can you repair an immersion rod
(a) No (b) Yes
(c) It depend on condition (d) None above.
- 51 A wire gauge is used to measure diameter of
(a) Wire (b) cable
(c) OH conductor (d) Any above
- 52 To improve the power factor, capacitors are connected in the circuit as
(a) Parallel path (b) Series path
(c) Any of a & b (d) None of the above
- 53 To switch ON or switch OFF the supply in accordance with day light, following is used
(a) Light dependent resistor (b) Light emitting diode
(c) Any of a & b (d) None of the above
- 54 In order to draw more current from the electric source
(a) Resistors are connected in parallel
(b) Resistors are connected in series
(c) Resistors are connected in series and parallel
(d) None of the above.

- 55 If a 60 W and 100 W lamps in series and are connected to a source of supply, which lamp will give more light
(a) 100 W (b) 60 W
(c) Both will give same light (d) None of the bulb will glow.
- 56 Power is defined as
(a) Capacity of doing work (b) Rate of doing work
(c) Product of force and distance (d) Energy dissipated by load.
- 57 Unit of electric power is
(a) Kilowatt (b) watt
(c) Kilowatt hour (d) watt hour
- 58 The internal resistance of battery is increased by
(a) Increase in no. of cells
(b) Decrease in no. of cells
(c) None of the above
- 59 A generators converts
(a) Mechanical energy into light
(b) Electrical energy to mechanical energy
(c) Mechanical energy to electrical energy
(d) None of the above
- 60 Power factor of AC circuit is equal to
(a) Tan of phase angle (b) Sine of phase angle
(c) Cosine of phase angle (d) None of the above
- 61 Resistance of open circuit is equal to
(a) Zero (b) Infinity
(c) Less than 1 ohm (d) None above
- 62 Laminated core is used to reduce
(a) Hysteresis loss (b) Eddy current loss
(c) Copper loss (d) iron loss
- 63 Which of the following is not a non conventional energy source
(a) Solar (b) Bio gas
(c) Wind (d) Electricity
- 64 Solar energy is used for
(a) Lighting (b) Cooking
(c) Battery charging (d) All above

- 65 Solar and wind hybrid system is
(a) Becoming popular (b) Not possible
(c) Conventional energy source (d) None of the above
- 66 Bio gas depends on
(a) Electrical energy (b) Waste products
(c) Both a and b (d) None of the above
- 67 Which of the following is not a constituent of a solar lighting system
(a) Photo voltaic cell (b) Back up batteries
(c) Charger (d) Earth wire.
- 68 Which of the following is not a type of fuse
(a) HRC (b) Rewirable
(c) Ceramic (d) None above.
- 69 Which of the following is not a type of generating station?
(a) Thermal (b) Nuclear
(c) Hydro (d) Atmospheric
- 70 Which of the following is not a part of overhead distribution line
(a) Conductor (b) Insulator
(c) Cross arms (d) Thimbles
- 71 Type of insulator not used in a 3 phase, 440 V overhead distribution line
(a) Pin (b) Shackle
(c) Disc (d) None above
- 72 Instrument connected in the circuit with the ammeter (in panel) to facilitate the measurement of current is
(a) Current transformer (b) Potential transformer
(c) Excitation transformer (d) None of the above
- 73 Capacitor opposes
(a) Instantaneous change of voltage (b) Instantaneous change of current
(c) Instantaneous change in resistance (d) None of the above
- 74 Inductor opposes
(a) Instantaneous change of voltage
(b) Instantaneous change of current
(c) Instantaneous change in resistance
(d) None of the above
- 75 Current is
(a) Rate of flow of charge (b) Gradual change in resistance
(c) Linear change in capacitance (d) None of the above.

- 76 When resistances are connected in parallel, the equivalent resistance
(a) Decreases (b) Increases
(c) No change (d) May increase or decrease
- 77 When resistances are connected in series, the equivalent resistance
(a) Decreases (b) Increases
(c) No change (d) May increase or decrease
- 78 Diode allows the flow of the current
(a) In one direction (b) In both the directions
(c) Flow of current not allowed (d) None of the above.
- 79 When capacitances are connected in parallel, the equivalent capacitance
(a) Decreases (b) Increases
(c) no change (d) May increase or decrease
- 80 When capacitances are connected in series, the equivalent capacitance
(a) Decreases (b) Increases
(c) No change (d) May increase or decrease
- 81 Two lamps of 60 W and one of 100 W are connected in series to a supply 220 V, the current flowing in the circuit will be
(a) 1A (b) 2A
(c) 3A (d) 4A
- 82 A 2 x 40 W box type fitting glows for 10 hrs in a day, units consumed per day will be
(a) 0.72 (b) 0.04
(c) 0.8 (d) 1
- 83 A 2 x 40 W box type fitting glows for 10 hrs in a day, electric charges for the month of June @ Rs. 3/- per unit will be Rs.
(a) 18 (b) 3.60
(c) 72 (d) 90
- 84 One ordinary ceiling fan works for 12 hrs in a day, units consumed per day will be
(a) 0.72 (b) 0.04
(c) 0.8 (d) 1
- 85 One ordinary ceiling fan works for 12 hrs in a day, electric charges per day @ Rs. 2/- per unit will be
(a) 0.72 (b) 1.44
(c) 0.8 (d) 1

- 86 One 20 inch desert cooler (150 W) works for 8 hrs per day, units consumed per day will be
(a) 1.2 (b) 1.8
(c) 2.1 (d) 2.4
- 87 One 20 inch desert cooler (150 W) works for 8 hrs per day, electric charges for the month of July @ Rs. 3/- per unit will be
(a) 111.6 (b) 110.2
(c) 90 (d) 115.3
- 88 A geyser of 25 ltrs., 1500 W remains ON for 2 hrs per day, units consumed for 6 months will be
(a) 540 (b) 480
(c) 620 (d) 700
- 89 One 60 w lamp and 2 fans works for 10 hrs per day, units consumed per day will be
(a) 1.8 (b) 2.1
(c) 1.7 (d) 3
- 90 A 10 hp pump works for 10 hrs per day, monthly consumption will be
(a) 223.8 (b) 2.23
(c) 22.38 (d) 2238
- 91 A grinder in a factory, equipped with 1.5 hp motor, works for 6 hrs per day, the units consumed per day will be
(a) 5.490 (b) 6.714
(c) 2388 (d) 1940
- 92 Internal resistance of a cell is 0.1 ohm and 10 cells are connected in series to form a battery supplying a current of 1 A, the power lost in the battery is
(a) 0.5 W (b) 1 W
(c) 5 W (d) 50 W
- 93 The resistance of human body lies between
(a) 100-200 ohm (b) 5 K ohm-50 K ohm
(c) 1 M ohm-10 M ohm (d) 100 k ohm-500 K ohm
- 94 Instrument used to measure electric energy consumption is
(a) Galvanometer (b) Potentiometer
(c) Energy meter (d) None of the above
- 95 Which of the following keeps the poles straight
(a) Stay rod (b) Cross arm
(c) Conductor (d) Insulator

- 96 Inside the geyser there is a
(a) Filament (b) Immersion rod
(c) Any of a & b (d) None of the above
- 97 Which of the following is used for concealed wiring in a house
(a) PVC conduit (b) GI pipe
(c) Spun concrete pipe (d) Any of the above.
- 98 The size of copper wire used for point wiring in sq mm is
(a) 1.5 (b) 2.5
(c) 4 (d) 10
- 99 The size of copper wire used for sub main in sq mm is
(a) 1.5 (b) 2.5
(c) 4 (d) 10
- 100 The size of Aluminium wire used for point wiring in sq mm is
(a) 1.5 (b) 2.5
(c) 4 (d) 10
- 101 The combined Earth resistance of 33kV/11 kV receiving station should not exceed
(a) 1 ohm (b) 2 ohms
(c) 10 ohms (d) 20 ohms
- 102 The combined earth resistance of 11 kV/415 V Sub-station should not exceed
(a) 0.5 ohm (b) 2 ohms
(c) 10 ohms (d) 20 ohms
- 103 The integration time employed by supply authorities for recording M.D. for a 33 kV/415 V, 10 MVA Sub-station is –
(a) 5 minutes (b) 15 minutes
(c) 45 minutes (d) 60 minutes
- 104 While designing a sub-station anticipated future loads in the next ... years are taken
(a) 1 year (b) 2 years
(c) 20 years (d) 5-7 years
- 105 As per the present Tariff the minimum power factor of sub-station should be
(a) 0.8 (b) 0.85
(c) 0.90 (d) 0.95
- 106 The minimum clearance of lowest conductor from the ground of 33 kV lines, across the load.
(a) 3 M (b) 4 M
(c) 6.1 M (d) 14 M

107. The minimum clearance of lowest conductor from the ground of 33 kV lines, along a street.
- (a) 5.8 M (c) 3.0 M
(b) 4.0 M (d) 14 M
108. The minimum vertical clearance from 11 kV line to any part of building.
- (a) 2.0 M (b) 10.M
(c) 3.7 M (d) 6.0 M
109. The minimum Horizontal clearance of 11 kV lines from any buildings.
- (a) 1.2 M (b) 3.7 M
(c) 6.1 M (d) 10 M
110. The Visible, Audible, Partial discharge at the surface of conductor at high voltage is called –
- (a) Skin affect (b) Corona
(c) Creep (d) None of these
111. For maintaining power supply quantity the frequency variation of power supply are restricted to
- (a) $\pm 1\%$ (b) $\pm 3\%$
(c) $\pm 0.5\%$ (d) $\pm 10\%$
112. The 3 phase voltage unbalance in supply should not exceed
- (a) 2.5.% to 5% (b) 20%
(c) 25% (d) 10%
113. For maintaining power supply quality the rate of change of frequency should not exceed.
- (a) 5 Hz/Sec. (b) 10 Hz/Sec
(c) 1 HZ/Sec (d) 3 Hz/ Sec.
114. In Thermal Power plants the generator used are
- (a) AC 3 \emptyset , Induction Generators.
(b) AC 3 \emptyset , Synchronous Generators.
(c) D.C. Shunt Generators.
(d) AC 1 \emptyset Synchronous Generators.
115. The highest system voltage of normal 33 kV System for the purpose of design of equipments is
- (a) 30 kV. (b) 36 kV.
(c) 33 kV. (d) 66 kV.
116. The Rod gap on the L.V.side of 11 kV/415, 250 kVA Transformer is
- (a) 300 mm. (b) 100 mm.
(c) 50 mm. (d) Rod gap L.A. is not provided for LV side of Transformer.

117. The rated voltage of L.A. for 11 kV/415V Transformer Protection is
(a) 11 kV. (b) 12 kV.
(c) 9 kV. (d) 24 kV.
118. For medium sized 11 kV/415 v, 500 kVA Transformer sub-station, the type of L.A. used are
(a) Station type. (b) Line type.
(c) Distribution type. (d) None of these.
119. The line type L.A. used for our 11 kV and 33 kV Sub-station are having a standard normal discharge current (Peak).
(a) 5 KA. (b) 10 KA.
(c) 1.5 KA. (d) 2.5 KA.
120. The span of supports for 11 kV over head lines should not exceed.
(a) 100 m. (b) 65 m.
(c) 30 m. (d) 27 m.
121. The testing of relays should be performed at a interval of
(a) 6 months (b) 12 months
(c) 18 months (d) 24 months
122. If any live conductor in the circuit is entangled with tree branch _____ operates.
(a) EFR (b) OVR
(c) OLR (d) Thermal relay
123. _____ relay operates if there is a heavy increase in load current.
(a) EFR (b) OVR
(c) OLR (d) Thermal relay
124. _____ relay indicates the temperature rise of a transformer.
(a) EFR (b) OVR
(c) OLR (d) Thermal relay
125. If the relay setting of 60/5 CT is at 3.75, then the tripping will be at
(a) 60 Amp. (b) 45 Amp.
(c) 30 Amp.

126. The normal SPG of electrolyte of lead acid battery should be
(a) 1.160 (b) 1.180 (c) 1.220 (d) 1.240
127. The terminal voltage of a fully charged lead acid cell is
(a) 1.8 V (b) 2.0 V (c) 2.2 V (d) 2.4 V
128. The terminal voltage of a lead acid cell should not fall below
(a) 1.6 V (b) 1.8 V (c) 2.0 V (d) 2.2 V
129. The normal charging rate of 120 AH lead acid battery set is
(a) 4 A (b) 8 A (c) 12 A (d) 16 A
130. The ratio of distil water and acid used to prepare new electrolyte for lead acid cell is
(a) 1 : 1 (b) 2 : 1 (c) 3 : 1 (d) 4 : 1
131. Following law is applicable in the working of lead acid cell
(a) Faradays law of self induction.
(b) Faradays law of mutual induction
(c) Faradays law of electrolysis.
(d) Newton's law of motion.
132. The capacity of storage battery is expressed as
(a) No. of recharges it can take
(b) Time for which it can be used
(c) No. of cells it contain
(d) Ampere hour it can deliver.
133. Sedimentation in lead acid cell occurs due to
(a) Overcharging at high rate.
(b) Slow charging at low rate.
(c) Over discharge at low rate.
(d) Non-utilization for long periods.
134. Even when not in use, a lead acid battery should be recharged once in
(a) Six week (b) Six days
(c) Three months (d) Six months.
135. First step to be carried out before starting work starting work on faulty portion of overhead line is to
(a) Earth the line on both the ends of the portion
(b) Obtain the permit to work
(c) Bring ladder or crane
(d) Climb on the pole immediately

136. Before starting the work on faulty circuit it should be ensured that
- (a) The faulty portion has been isolated from the power supply
 - (b) The worker is strong enough to climb the pole
 - (c) The cable is not deep enough to dig
 - (d) None of the above.
137. The electric overhead line on which work is to be carried out should be necessarily earthed on both the ends to
- (a) Dispense the charge stored between the conductors due to capacitive effect
 - (b) To bring the line at zero potential
 - (c) Both a & b
 - (d) None of the above
138. One can protect himself from electric shock while working on live circuit by wearing gloves of good
- (a) Conducting material
 - (b) Insulating material
 - (c) Semiconductor material
 - (d) Any of the above.
139. Which of the following are principal safety precautions
- (a) Don't touch live wire or equipment with bare hands
 - (b) Before switching on supply, see no one is working in the line
 - (c) Use rubber gloves and meeting.
 - (d) All of the above.
140. Which of the following is most effective method of artificial respiration
- (a) Mouth to mouth air pumping method
 - (b) To use bicycle air pump
 - (c) Both a & b
 - (d) None of the above
141. Which material is recommended as fire extinguisher in electrical cases
- (a) Carbon tetra chloride
 - (b) Carbon dioxide
 - (c) Sulphur hexafluoride
 - (d) Any of the above
142. Which of the following is to be necessarily kept in a electric substation
- (a) First aid box
 - (b) Stretcher
 - (c) Earthing rod
 - (d) All of the above

143. The warning board to be provided, on the switch of the line on which work is going on
- (a) Man working
 - (b) Danger
 - (c) Keep away
 - (d) None of the above
144. Staff competent to work on overhead line of MV should be
- (a) Unskilled
 - (b) Semi skilled
 - (c) Highly skilled
 - (d) Any of the above
145. Which of the following is a renewable source of energy?
- a) coal
 - b) oil
 - c) Natural gas
 - d) Solar
146. The law of conservation of energy states that energy
- a) can be created and destroyed
 - b) is destroyed in the process of burning
 - c) cannot be converted from one
 - d) is neither destroyed nor created form to another
147. Absolute pressure is
- a) Gauge Pressure
 - b) Atmospheric Pressure
 - c) Gauge pressure + Atmospheric Pressure
 - d) Gauge Pressure – Atmospheric Pressure
148. 100 kCals expressed as kilojoules would be
- a) 418.7 kJ
 - b) 4.187 Joules
 - c) 4.187 kJ
 - d) 41.87 kJ
149. When heat flows from one place to another by means of a liquid or gas, it is being transferred by
- a) radiation
 - b) conduction
 - c) sublimation
 - d) convection
150. How many watts are in a hp?
- a) 700
 - b) 725
 - c) 740
 - d) 746
151. The characteristic of an electrical circuit that forces current to flow is
- a) watts
 - b) amps
 - c) ohms
 - d) volts
152. Voltage and resistance in an electrical circuit are related by Ohm's law and determine
- a) resistance
 - b) voltage
 - c) the type of circuit
 - d) current

153. The characteristic of an electrical circuit that opposes current flow is
a) resistance b) voltage c) friction d) power
154. The instrument used to measure RPM is
a) Fyrite b) Pyrometer
c) Ultrasonic flow meter d) Stroboscope
155. Which of the following terms does not refer to specific energy consumption
a) Kwh/ton b) kcal/kL c) kJ/kg d) kg
156. Which of the following will not motivate the employees for energy conservation ?
a) Incentive b) Recognition c) Reward d) Threatening
157. The heat input required for generating ‘one’ kilo watt-hour of electrical output is called as ____.
a) Efficiency b) Heat Rate c) Calorific Value d) Heat value
158. Which of the voltage is not available for Indian distribution system?
a) 33 kV b) 11 kV c) 280 V d) 433 V
159. The power loss in transmission/distribution line depends on ____.
a) Current in the line b) Resistance of the line c) Length of the line d) All
160. If distribution of power is raised from 11 kV to 66 kV, the voltage drop would lower by
a) 6 times b) 1/6 times c) 36 times d) 1/36 times
161. If the distribution voltage is raised from 11 kV to 33 kV, the line loss would be:
a) Less by 1/9 b) More by 9 times c) No change d) None of the above
162. The maximum demand of an industry, if trivector motor records 3600 KVA for 15 minutes and 3000 kVA for next 15 minutes over a recording cycle of 30 minutes is ____.
a) 3600 kVA b) 3000 kVA c) 3300 kVA d) 600 kVA
163. Presenting the load demand of a consumer against time of the day is known as ____.
a) Time Curve b) Load curve c) Demand curve d) Energy curve
164. The vector sum of active power and reactive power required is ____.
a) Apparent Power b) Power Factor c) Load Factor d) Maximum Demand
165. Power factor is the ratio of ____ and apparent power.
a) Active power b) Reactive power c) Load Factor d) Maximum Demand
166. The kVAr rating required for improving the power factor of a load operating at 500 kW and 0.85 power factor to 0.95 is ____.
a) 145 kVAr b) 500 kVAr c) 50 kVAr d) 100 kVAr

167. The rating of the capacitor at motor terminals should not be greater than _____.
 a) magnetizing kVAR of the motor at full load
 b) magnetizing kVAR of the motor at no load
 c) magnetizing kVAR of the motor at half load
 d) magnetizing kVAR of the motor at 75% load
168. The percentage reduction in distribution losses when tail end power factor raised from 0.8 to 0.95 is _____.
 a) 29% b) 15.8% c) 71% d) 84%
169. If voltage applied to a 415 V rated capacitors drops by 10%, its VAR output drops by _____.
 a) 23% b) 87% c) 19% d) 10%
170. The ratio between the number of turns on the primary to the turns on the secondary of a transformer is know as:
 a) turns ratio b) efficiency
 c) winding factor d) power factor
171. The ratio of overall maximum demand of the plant to the sum of individual maximum demand of various equipments is _____.
 a) load factor b) diversity Factor
 c) demand Factor d) maximum demand
172. Core losses in transformer are caused by _____.
 a) Hysteresis loss b) Eddy current loss c) both a & b d) None
173. The load losses in transformer vary according to _____.
 a) Loading of transformer b) Square of loading of transformer
 c) Cube of loading of transformer d) None
174. The total losses in a transformer operating at 50% load with designed no load and load losses at 2 kW and 20 kW respectively are _____.
 a) 7 kW b) 12 kW c) 4.5 kW d) 22 kW
175. The total amount of harmonics present in the system is expressed using _____.
 a) Total Harmonic Factor b) Total Harmonic Ratio
 c) Total Harmonic Distortion d) Crest Factor
176. The 5th and 7th harmonic in a 50 Hz power environment will have:
 a) voltage and current distortions with 55 Hz & 57 Hz
 b) voltage and current distortions with 500 Hz & 700 Hz
 c) voltage and current distortions with 250 Hz & 350 Hz
 d) no voltage and current distortion at all
177. The type of energy possessed by the charged capacitor is
 a) Kinetic energy b) Electrostatic c) Potential d) Magnetic

178. The energy stored in the bonds of atoms and molecules is called
- Kinetic energy
 - Chemical energy
 - Potential energy
 - Magnetic energy
179. Active power consumption of motive drives can be determined by using one of the following relations.
- $\sqrt{3} \times V \times I$
 - $\sqrt{3} \times V^2 \times I \times \cos\phi$
 - $\sqrt{3} \times V \times I^2 \times \cos\phi$
 - $\sqrt{3} \times V \times I \times \cos\phi$
180. The grade of energy can be classified as low, high, extra ordinary. In case of electrical energy it would fall under _____ category. (**EM/EA**)
- low grade
 - extra ordinary grade
 - high grade
 - none of the above
181. The portion of apparent power that doesn't do any work is termed as
- Apparent power
 - Active power
 - Reactive Power
 - None of the above
182. Power factor (PF) is the ratio of (**EM/EA**)
- Apparent power & Active power
 - Active power & Reactive power
 - Active Power & Apparent power
 - Apparent power & Reactive power
183. kVA is also called as
- reactive power
 - apparent power
 - active power
 - captive power
184. The energy consumed by a 50 kW motor loaded at 40 kW over a period of 4 hours is
- 50 kWh
 - 160 kWh
 - 40 kWh
 - 2000 kWh
185. The ratio of maximum demand to the connected load is termed as
- Load factor
 - Demand factor
 - Contract demand
 - none of the above
186. A single phase induction motor is drawing 10 amps at 230 volts. If the operating power factor of the motor is 0.9, then the power drawn by the motor is
- 2.3 kW
 - 3.58 kW
 - 2.07 kW
 - 2.70 kW
187. The quantity of heat required to raise the temperature of 1 gram of water by 1 °C is termed as
- Specific heat
 - Heat capacity
 - One Calorie
 - Sensible heat
188. Nameplate kW or HP rating of a motor indicates
- input kW to the motor
 - output kW of the motor
 - minimum input kW to the motor
 - maximum input kW to the motor

189. The quantity of heat required to change 1 kg of the substance from liquid to vapor state without change of temperature is termed as
- a) Latent heat of fusion b) Latent heat of vaporization
c) Heat capacity d) Sensible heat
190. The latent heat of condensation of 1 kg of steam at 100 °C to form water at 100 °C, it gives out the heat of
- a) 580 kCal b) 540 kCal c) 620 kCal d) 2260 kCal
191. The specific heat of _____ is very high compared to other common substances listed below.
- a) Lead b) Mercury c) Water d) Alcohol
192. The property of viscosity of liquid fuels:
- a) decreases with decreasing temperature
b) increases with increasing temperature
c) decreases with increasing temperature
d) increases with decreasing temperature
193. The quantity of heat Q, supplied to a substance to increase its temperature depends upon the following.
- a) sensible heat added b) latent heat of fusion
c) specific heat of the substance d) heat capacity
194. Unit of specific heat in SI system is_____.
- a) joule /kg °C b) kg/cm² c) kcal/m³ d) kcal/cm²
195. The change by which any substance is converted from a gaseous state to liquid state is termed as -----
- a) condensation b) Evaporation c) Fusion d) Phase change
196. The method of producing power by utilizing steam generated for process in the boiler is termed as -----
- a) Extraction b) Cogeneration c) Both a & b d) Neither a nor b

2. TRANSFORMERS

1. The BDV of transformer oil should be
 - (a) 20 kV
 - (b) 30 kV
 - (c) 40 kV
 - (d) 50 kV
2. The colour of moisten silica gel is
 - (a) Pink
 - (b) Blue
 - (c) Yellow
 - (d) Green
3. The material filled in breather of transformer is
 - (a) Silica gel
 - (b) Sulphuric acid
 - (c) SF₆
 - (d) Mineral oil
4. The protective device to indicate the internal fault in a transformer is
 - (a) Thermal relay
 - (b) Bucholz relay
 - (c) OVR
 - (d) EFR
5. The minimum allowable BDV for transformer oil should stand for
 - (a) 15 sec
 - (b) 30 sec
 - (c) 45 sec
 - (d) 60 sec
6. While testing transformer oil the gap between electrodes is kept at a distance of
 - (a) 1 mm
 - (b) 2 mm
 - (c) 3 mm
 - (d) 4 mm
7. Core of a transformer is made up of
 - (a) Aluminium
 - (b) Carbon
 - (c) Lead
 - (d) Silicon steel.
8. Which of the following is not the function of a transformer oil
 - (a) Cooling of primary coils
 - (b) Cooling of secondary coils.
 - (c) Providing additional insulation.
 - (d) Providing inductive coupling.
9. For a transformer, the condition for maximum efficiency is
 - (a) Hysteresis loss = eddy current loss
 - (b) Core loss = hysteresis loss
 - (c) Copper loss = Iron loss
 - (d) Total loss = $\frac{2}{3}$ copper loss.
10. Transformer oil shall be free from
 - (a) Odour
 - (b) Gases
 - (c) Temperature
 - (d) Moisture.

- 11 The power factor in a transformer
- (a) Is always unity
 - (b) Is always leading
 - (c) Is always lagging
 - (d) Depends on power factor of load.
- 12 The short circuit test of a transformer gives
- (a) Copper loss at full load
 - (b) Copper loss at half load
 - (c) Iron loss at any load
 - (d) Sum of iron loss and copper load.
- 13 The open circuit test of transformer determines
- (a) Iron loss
 - (b) Copper loss at full load
 - (c) Copper loss at half load
 - (d) Total losses.
- 14 The type of oil, which is suitable as transformer oil is
- (a) Crude oil
 - (b) Organic oil
 - (c) Mineral oil
 - (d) Animal oil.
- 15 A step up transformer increases
- (a) Power
 - (b) Current
 - (c) Voltage
 - (d) Frequency.
- 16 Which test is conducted on all transformers in a manufacturing concern
- (a) Routine test
 - (b) Type test
 - (c) Special test
 - (d) All above
- 17 The colour of fresh dielectric oil for a transformer
- (a) Pale yellow
 - (b) Dark brown
 - (c) White to grey
 - (d) Colourless
- 18 The ratio of kW to kVA is known as
- (a) Voltage regulation
 - (b) power factor
 - (c) Transformation ratio
 - (d) None above
- 19 Core lifting of a transformer is done after a period of
- (a) 3 yrs.
 - (b) 4 yrs.
 - (c) 5 yrs.
 - (d) 6 yrs.
- 20 The purpose of conservator tank in a transformer is to
- (a) Monitor the oil level
 - (b) Top up the oil level
 - (c) Both a & b above
 - (d) None of the above.

21. Transformers placed in a room enclosed from all the four sides, the minimum spacing between the walls and the transformer should be
- (a) 0.5 m (b) 0.75 m
(c) 1 m (d) 1.25 m
22. For indoor installation the minimum clearance between the highest point of the conservator tank to the ceiling of the transformer room should be
- (a) 0.25 m (b) 0.5 m
(c) 0.75 m (d) 1 m
23. At an atmospheric temperature of 45 deg C and keeping in view the working condition, the winding temperature of the transformer should not exceed
- (a) 80 deg C (b) 95 deg C
(c) 110 deg C (d) 130 deg C
24. Which of the following does not change in a transformer?
- a. Current b. Voltage
c. Frequency d. All of the above
25. In a transformer the energy is conveyed from primary to secondary
- a. through cooling coil b. through air
c. by the flux d. none of the above
26. A transformer core is laminated to
- a. reduce hysteresis loss b. reduce eddy current losses
c. reduce copper losses d. reduce all above losses
27. The path of a magnetic flux in a transformer should have
- a. high resistance b. high reluctance
c. low resistance d. low reluctance
28. No-load test on a transformer is carried out to determine
- a. copper loss b. magnetizing current
c. magnetizing current and loss d. efficiency of the transformer
29. The dielectric strength of transformer oil is expected to be
- a. 1 kV b. 33 kV
c. 100 kV d. 330 kV
30. The efficiency of a transformer will be maximum when
- a. copper losses = hysteresis losses b. hysteresis losses = eddy current losses
c. eddy current losses = copper losses d. copper losses = iron losses
31. No-load current in a transformer
- a. lags behind the voltage by about 75° b. leads the voltage by about 75°
c. lags behind the voltage by about 15° d. leads the voltage by about 15°

32. The purpose of providing an iron core in a transformer is to
- provide support to windings
 - reduce hysteresis loss
 - decrease the reluctance of the magnetic path
 - reduce eddy current losses
33. Which of the following is not a part of transformer installation?
- Conservator
 - Breather
 - Buchholz relay
 - Exciter
34. While conducting short – circuit test on a transformer the following side is short-circuited
- High voltage side
 - Low voltage side
 - Primary side
 - Secondary side
35. In the transformer following winding has got more cross-section area
- low voltage winding
 - High voltage winding
 - primary winding
 - secondary winding
36. A transformer transforms
- voltage
 - current
 - power
 - frequency
37. A transformer cannot raise or lower the voltage of a D.C. supply because
- there is no need to change the D.C. voltage
 - a D.C. circuit has more losses
 - Faraday's laws of electromagnetic induction are not valid since the rate of change of flux is zero
 - none of the above
38. Primary winding of a transformer
- is always a low voltage winding
 - is always a high voltage winding
 - could either be a low or high voltage winding
 - none of the above
39. Which winding in a transformer has more number of turns?
- Low voltage winding
 - High voltage winding
 - Primary winding
 - Secondary winding
40. Efficiency of a power transformer is of the order of
- 100 percent
 - 98 percent
 - 50 percent
 - 25 percent
41. A common method of cooling a power transformer is
- natural air cooling
 - air blast cooling
 - oil cooling
 - any of the above
42. In a transformer routine efficiency depends upon
- supply frequency
 - load current
 - power factor of load
 - both (b) and (c)

43. The maximum efficiency of a distribution transformer is
- at no load
 - at 50% full load
 - at 80% full load
 - at full load
44. Transformer breaths in when
- load on it increases
 - load on it decreases
 - load remains constant
 - none of the above
45. No-load current of a transformer has
- has high magnitude and low power factor
 - has high magnitude and high power factor
 - has small magnitude and high power factor
 - has small magnitude and low power factor
46. Spacers are provided between adjacent coils
- to provide free passage to the cooling oil
 - to insulate the coils from each other
 - both (a) and (b)
 - none of the above
47. In a transformer the tappings are generally provided on
- primary side
 - secondary side
 - low voltage side
 - high voltage side
48. The chemical used in breather for transformer should have the quality of
- ionizing air
 - absorbing moisture
 - cleaning the transformer oil
 - cooling the transformer oil
49. The chemical used in breather is
- asbestos fibre
 - silica sand
 - sodium chloride
 - silica gel
50. The transformer ratings are usually expressed in terms of
- Volts
 - amperes
 - kW
 - kVA
51. Material used for construction of transformer core is usually
- Wood
 - copper
 - Aluminium
 - silicon steel
52. The thickness of lamination used in a transformer is usually
- 0.4mm to 0.5 mm
 - 4 mm to 5 mm
 - 14mm to 15mm
 - 25mm to 40 mm
53. The function of conservator in a transformer is
- to protect against internal fault
 - to reduce copper as well as core losses
 - to cool the transformer oil
 - to take care of the expansion and contraction of transformer oil due to variation of temperature of surroundings

54. A Buchholz relay can be installed on
- auto-transformers
 - air-cooled transformers
 - welding transformers
 - oil cooled transformers
55. Buchholz's relay gives warning and protection against
- electrical fault inside the transformer itself
 - electrical fault outside the transformer in outgoing feeder
 - for both outside and inside faults
 - none of the above
56. The transformer laminations are insulated from each other by
- mica strip
 - thin coat of varnish
 - paper
 - any of the above
57. During open circuit test of a transformer
- primary is supplied rated voltage
 - primary is supplied full-load current
 - primary is supplied current at reduced voltage
 - primary is supplied rated kVA
58. Open circuit test on transformers is conducted to determine
- hysteresis losses
 - copper losses
 - core losses
 - eddy current losses
59. Short circuit test on transformers is conducted to determine
- hysteresis losses
 - copper losses
 - core losses
 - eddy current losses
60. The function of breather in a transformer is
- to provide oxygen inside reduced load
 - to cool the coils during reduced load
 - to cool the transformer oil
 - to arrest flow of moisture when outside air enters the transformer
61. The secondary winding of which of the following transformers is always kept closed?
- Step-up transformer
 - Step-down transformer
 - Potential transformer
 - Current transformer
62. For a transformer, operating at constant load current, maximum efficiency will occur at
- 0.8 leading power factor
 - 0.8 lagging power factor
 - zero power factor
 - unity power factor
63. Which of the following protection is normally not provided on small distribution transformers?
- Over-fluxing protection
 - Buchholz relay
 - Over-current protection
 - All of the above

64. Which of the following acts as a protection against high voltage surges due to lightning and switching?
- a. Horn gaps
 - b. Thermal overload relays
 - c. Breather
 - d. Conservator
65. Which of the following parts of a transformer is visible from outside?
- a. Bushings
 - b. Core
 - c. Primary winding
 - d. Secondary winding
66. The noise produced by a transformer is termed as
- a. zoom
 - b. hum
 - c. Ringing
 - d. buzz
67. Which of the following loss in a transformer is zero even at full load?
- a. core loss
 - b. friction loss
 - c. eddy current loss
 - d. hysteresis loss
68. If a transformer is continuously operated the maximum temperature rise will occur in
- a. Core
 - b. windings
 - c. Tank
 - d. any of the above
69. An open-circuit test on a transformer is conducted primarily to measure
- a. Insulation Resistance
 - b. Copper loss
 - c. Core loss
 - d. Total loss
70. A no-load test is performed on a transformer to determine
- a. Core loss
 - b. Copper loss
 - c. Efficiency
 - d. Magnetising current and loss

3. EARTHING

1. The code of practice for earthing is governed by
(a) IS: 3043 (b) IS: 4340 (c) IS: 4340 (d) IS: 4430
2. The length of pipe electrode used for earthing should not be less than
(a) 3.5 m (b) 4 m (c) 4.5 m (d) 5 m
3. As per IS, the earthing electrode shall not be within a distance of _____ mtrs from any building being earthed.
(a) 0.5 m (b) 1 m (c) 1.5 m (d) 2 m
4. Maximum permissible earth resistance at large power stations is
(a) 0.5 ohm (b) 1 ohm (c) 2 ohms (d) 8 ohms
5. Maximum permissible earth resistance at major power stations is
(a) 0.5 ohm (b) 1 ohm (c) 2 ohms (d) 8 ohms
6. Maximum permissible earth resistance at small power stations is
(a) 0.5 ohm (b) 1 ohm (c) 2 ohms (d) 8 ohms
7. Maximum permissible earth resistance for buildings is
(a) 0.5 ohm (b) 1 ohm (c) 2 ohms (d) 8 ohms
8. Earth continuity inside an installation i.e. from plate earth to any point in installation should be
(a) 0.5 ohm (b) 1 ohm (c) 2 ohms (d) 8 ohms
9. The plate electrode of copper used for earthing should be with minimum size of
(a) 50cm x 50cm x 3.15mm (b) 50cm x 50cm x 6.3mm
(c) 60cm x 60cm x 3.15mm (d) 60cm x 60cm x 6.3mm
10. The plate electrode of GI or steel used for earthing should be with minimum size of
(a) 50cm x 50cm x 3.15mm (b) 50cm x 50cm x 6.3mm
(c) 60cm x 60cm x 3.15mm (d) 60cm x 60cm x 6.3mm
11. In pipe earthing, the minimum internal diameter for GI pipe should be
(a) 30 mm (b) 40 mm (c) 50 mm (d) 60 mm
12. In pipe earthing, the minimum internal diameter for cast iron pipe should be
(a) 80 mm (b) 90 mm (c) 100 mm (d) 60 mm
13. Copper strip electrodes used for earthing should not be less than
(a) 22.5 mm x 1.60 mm (b) 20 mm x 2.5 mm
(c) 25 x 1.60 mm (d) 25 mm x 2.5 mm

- 14 GI or Steel strip electrodes used for earthing should not be less than
(a) 25 mm x 4mm (b) 20 mm x 3 mm
(c) 25mm x 3mm (d) 20mm x 4mm
- 15 Earthing arrangement for HT installations, substations and generating stations should be inspected at an interval of
(a) 3 months (b) 6 months (c) 9 months (c) 12 months
- 16 Earthing arrangement for low voltage installations such as service builings, public buildings should be inspected at an interval of
(a) 3 months (b) 6 months (c) 9 months (c) 12 months
- 17 Earthing arrangement for residential buildings should be inspected at an interval of
(a) 3 months (b) 6 months (c) 9 months (c) 12 months
- 18 Earthing arrangement for medium voltage installations should be inspected at an interval of
(a) 3 months (b) 6 months (c) 9 months (c) 12 months

4. LIGHTING & ILLUMINATION

1. The illumination level at A class stations should be
(a) 20 lux (b) 30 lux (c) 40 lux (d) 50 lux
2. The illumination level at B class stations should be
(a) 20 lux (b) 30 lux (c) 40 lux (d) 50 lux
3. The illumination level at C class stations should be
(a) 20 lux (b) 30 lux (c) 40 lux (d) 50 lux
4. Recommended no. of light points in type I (DR) quarter is
(a) 5 (b) 6 (c) 7 (d) 8
5. Recommended no. of light points in type II quarter is
(a) 5 (b) 6 (c) 7 (d) 8
6. Recommended no. of light points in type III quarter is
(a) 5 (b) 6 (c) 7 (d) 8
7. Recommended no. of light points in type IV quarter is
(a) 8 (b) 9 (c) 10 (d) 11
8. Recommended no. of light points in type IV spl. quarter is
(a) 11 (b) 12 (c) 13 (d) 14
9. Recommended no. of fan points in type I quarter is
(a) 2 (b) 3 (c) 4 (d) 5
10. Recommended no. of fan points in type II quarter is
(a) 2 (b) 3 (c) 4 (d) 5
11. Recommended no. of fan points in type III quarter is
(a) 2 (b) 3 (c) 4 (d) 5
12. Recommended no. of fan points in type IV quarter is
(a) 2 (b) 3 (c) 4 (d) 5
13. Recommended no. of fan points in type IV spl. quarter is
(a) 2 (b) 3 (c) 4 (d) 5
14. Recommended connected load for type I (DR) quarter is
(a) 1.36 kW (b) 3.48 kW (c) 4.17 kW (d) 6.85 kW

- 15 Recommended connected load for type II quarter is
(a) 1.36 kW (b) 3.48 kW (c) 4.17 kW (d) 6.85 kW
- 16 Recommended connected load for type III quarter is
(a) 1.36 kW (b) 3.48 kW (c) 4.17 kW (d) 6.85 kW
- 17 Recommended connected load for type IV quarter is
(a) 1.36 kW (b) 3.48 kW (c) 4.17 kW (d) 6.85 kW
- 18 Recommended connected load for type IV spl. quarter is
(a) 4.17 kW (b) 6.85 kW (c) 8.6 kW (d) 11.85 kW
- 19 Recommended connected load for type V quarter is
(a) 4.17 kW (b) 6.85 kW (c) 8.6 kW (d) 11.85 kW
20. Luminous efficiency of a fluorescent tube is
a. 10 lumens/ watt b. 20 lumens/ watt
c. 40 lumens/ watt d. 60 lumens/ watt
21. Candela is the unit of which of the following?
a. wavelength b. luminous intensity
c. luminous flux d. frequency
22. Colour of light depends upon
a. frequency b. wave length
c. both (a) and (b) d. speed of light
23. Illumination of one lumen per sq. metre is called
- a. lumen metre b. lux
c. foot candle d. candela
24. The unit of luminous flux is
- a. watt/ m² b. lumen
c. lumen/ m² d. watt
25. Filament lamps operate normally at a power factor of
a. 0.5 lagging b. 0.8 lagging
c. unity d. 0.8 leading
26. What percentage of the input energy is radiated by filament lamps?
a. 2 to 5 percent b. 10 to 15 percent
c. 25 to 30 percent d. 40 to 50 percent
27. The filament of a GLS lamp is made of
a. tungsten b. copper
c. carbon d. aluminium

28. Which of the following lamps is the cheapest for the same wattage?
- Fluorescent tube
 - mercury vapour lamp
 - GLS lamp
 - sodium vapour lamp
29. Which of the following is not the standard rating of GLS lamps?
- 100 W
 - 75 W
 - 40 W
 - 15 W
30. The colour of sodium vapour discharge lamp is
- red
 - pink
 - yellow
 - bluish green
31. A reflector is provided to
- protect the lamp
 - provide better illumination
 - avoid glare
 - do all of the above
32. The purpose of coating the fluorescent tube from inside with white powder is
- to improve its life
 - to improve the appearance
 - to change the colour of light emitted to white
 - to increase the light radiations due to secondary emissions
33. In the fluorescent tube circuit the function of choke is primarily to
- reduce the flicker
 - minimize the starting surge
 - initiate the arc and stabilize it
 - reduce the starting current
34. The function of capacitor across the supply to the fluorescent tube is primarily to
- stabilize the arc
 - reduce the starting current
 - improve the supply power factor
 - reduce the noise
35. Most affected parameter of a filament lamp due to voltage change is
- wattage
 - life
 - luminous efficiency
 - light output
36. In electric discharge lamps for stabilizing the arc
- a reactive choke is connected in series with the supply
 - a condenser is connected in series to the supply
 - a condenser is connected in parallel to the supply
 - a variable resistor is connected in the circuit to the supply
37. For precision work the illumination level required is of the order of
- 500 – 1000 lumens/m²
 - 200 – 400 lumens/m²
 - 50 – 100 lumens/ m²
 - 10 – 25 lumens/ m²
38. For normal reading the illumination level required is around
- 20 – 40 lumens/ m²
 - 60 – 100 lumens/ m²
 - 200 – 300 lumens/ m²
 - 400 – 500 lumens/ m²

39. In electric discharge lamps light is produced by
- cathode ray emission
 - ionization in a gas or vapour
 - heating effect of current
 - magnetic effect of current
40. A substance which change its electrical resistance when illuminated by light is called.....
- photoelectric
 - photovoltaic
 - photoconductive
 - none of the above
41. In case of ... power factor is the highest.
- GLS lamps
 - mercury arc lamps
 - tube lights
 - sodium vapour lamps
42. A mercury vapour lamp gives ... light.
- white
 - pink
 - yellow
 - greenish blue
43. Sometimes the wheels of rotating machinery, under the influence of fluorescent lamps appear to be stationary. This is due to the
- low power factor
 - stroboscopic effect
 - fluctuations
 - luminescence effect
44. The flicker effect of fluorescent lamps is more pronounced at
- lower frequencies
 - higher frequencies
 - lower voltages
 - higher voltages
45. Which gas can be filled in GLS lamp?
- oxygen
 - carbon di-oxide
 - xenon
 - any inert gas
46. The gas filled in vacuum filament lamps is
- nitrogen
 - argon
 - air
 - none
47. The vapour discharge tube used for domestic lighting has
- no filament
 - one filament
 - two filament
 - three filament
48. Stroboscopic effect due to use of discharge lamps in workshops results in moving machinery appearing
- stationary
 - stationary running slow
 - stationary running in reverse direction
 - all of the above
49. Glare is reduced by
- using diffusers
 - increasing the height of the lamp
 - using reflectors to cut-off the light at certain angle
 - all of the above

50. 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
51. When an electric bulb is broken it produces bang; this is due to
- a. vacuum inside the bulb
 - b. pressure of air in the bulb
 - c. pressure inside is equal to that outside
 - d. none of the above

5. D.G. SET

- 1 If a DG set fails to start, the probable cause may be

(a) Dirty clogged air cleaner	(b) Fuel tank empty
(c) Nozzle niddle jammed	(d) All of the above

- 2 If a DG set starts but stop after some time, the probable cause may be

(a) Air in fuel	(b) Fuel line choke
(c) Fuel filter choked	(d) All of the above

- 3 If a DG set is not gaining full speed, the probable cause may be

(a) Fuel tank empty	(b) Governor spring broken
(c) Fuel filter dirty	(d) All of the above

- 4 If a DG set misses during operation, the probable cause may be

(a) Air in fuel line	(b) Nozzle damaged
(c) Water mixed with fuel	(d) All of the above

- 5 If a DG set lacks power, the probable cause may be

(a) Pump may inject insufficient quantity of fuel	(b) Poor quality of fuel
(c) Dirty cooling system	(d) All of the above

- 6 If a DG set gives excessive smoke at no load, the probable cause may be

(a) Dirty clogged air cleaner	(b) choked fuel injection hole
(c) Faulty fuel pump	(d) All of the above

- 7 If a DG set excessive smoke at full load, the probable cause may be

(a) One or more cylinder not working	(b) Poor quality of oil
(c) Nozzle jammed	(d) All of the above

- 8 If a DG set gives out blue smoke, the probable cause may be

(a) Worn out liner on piston	(b) Wrong graded lubricating oil
(c) Engine used after a long time	(d) All of the above

- 9 If a DG set gives white smoke, the probable cause may be

(a) Water mixed with fuel	(b) Engine used after a long time
(c) Worn out liner piston	(d) All of the above

- 10 If a DG set overheats, the probable cause may be

(a) high exhaust back pressure	(b) Engine overloaded
(c) Damaged main or connecting bearings	(d) All of the above

- 11 If a DG set consumes excessive fuel, the probable cause may be

(a) Injector adjustment disturbed	(b) External/internal fuel leakage
(c) Incorrect value of fuel timing	(d) All of the above

- 12 If the alternator of DG set is overheats, the probable cause may be
(a) Improper ventilation (b) Misalignment
(c) Overloading of machine (d) All of the above
- 13 If the armature of DG set overheats, the probable cause may be
(a) Overloading (b) Internal short circuit
(c) Both a & b (d) None of the above
- 14 The maximum rated speed for 125 kVA Cummins make DG set is
(a) 1500 rpm (b) 1800 rpm (c) 2100 rpm (d) 2500 rpm
- 15 The oil temperature gauge of a DG set should normally read between
(a) 82-116 deg C (b) 90-125 deg C (c) 100-140 deg (d) 122-148 deg C
- 16 During warming up, the load should be applied gradually on a DG set until the oil temperature reaches
(a) 40 deg C (b) 60 deg C (c) 80 deg C (d) 100 deg C
- 17 The water temperature of DG set in operation should normally range between
(a) 60-80 deg C (b) 74-91 deg C (d) 88-98 deg C (d) 95-110 deg C
- 18 The pH value of the coolant in the radiator of a DG set should be maintained between
(a) 6.5 to 8.5 (b) 8.5 to 10.5 (c) 10.5 to 12.5 (d) 12.5 to 14.5
- 19 The diesel engine should not be operated if the pH value in the radiator is less than
(a) 6.5 (b) 8.5 (c) 10.5 (d) 12.5
- 20 Primary filters in the fuel system of the DG set should be cleaned at every
(a) 150 hrs (b) 200 hrs (c) 250 hrs (d) 300 hrs
- 21 Primary filters in the fuel system of the DG set should be replaced at every
(a) 500 hrs (b) 800 hrs (c) 1000 hrs (d) 1500 hrs
- 22 The secondary fuel filter of a DG set should be replaced when the fuel pressure gauge is below
(a) 10 psi (b) 12 psi (c) 15 psi (d) 20 psi
- 23 The exciter in a DG set is
(a) Shunt motor (b) Compound generator
(c) Either of a or b (d) None of the above.

24. The compression ratio in diesel engines is in the range of:
a) 10:1 to 15:1 b) 14:1 to 25:1 c) 5:1 to 10:1 d) 1:2 to 3:1
25. Which of the following is the last step in diesel engine operation?
a) Induction stroke b) Compression stroke c) Ignition stroke d) Exhaust stroke
26. The power requirement of the DG set is determined by:
a) base load b) Maximum load c) Partial load d) Zero load
27. Present specific fuel consumption value of DG sets in industries is about _____.
a) 220 g/kWh b) 100 g/kWh c) 160 g/kWh d) 50 g/kWh
28. The efficiency of diesel generating set falls in the region of:
a) 35 – 45% b) 50 – 60% c) 65 – 70% d) Above 80%
29. Auxiliary power consumption of DG set at full load in its operating capacity is about _____.
a) 1 - 2% b) 5 – 6% c) 10 - 12% d) Above 15%
30. The rating required for a DG set with 500 kW connected load and with diversity factor of 1.5, 80% loading and 0.8 power factor is _____.
a) 520 kVA b) 600 kVA c) 625 kVA d) 500 kVA
31. The starting current value of DG set should not exceed ___% of full load capacity of DG set.
a) 100 b) 200 c) 150 d) 300
32. The maximum permissible percentage unbalance in phase loads on DG sets is _____.
a) 5% b) 15% c) 10% d) 1%
33. The permissible percentage overload on DG sets for 1 hour in every 12 hours of operation is _____.
a) 5% b) 15% c) 10% d) 1%
34. Designed power factor of a DG set is generally at:
a) 1.0 b) 0.8 c) 0.9 d) 1.1
35. Lower power factor of a DG set demands _____.
a) Lower excitation currents b) Higher excitation currents
c) No change in excitation currents d) None of the above

36. Which of the following losses is the least in DG sets:
- a) cooling water loss b) exhaust loss
c) frictional loss d) alternator loss
37. The waste heat potential for a 1100 kVA set at 800 kW loading and with 480 °C exhaust gas temperature is ____
- a) 4.8 lakh kCal/hr b) 3.5 lakh kCal/hr c) 3 lakh kCal/hr d) 2 lakh kCal/hr
38. Typical exit flue gas temperature of 5 MW DG set operating above 80% load is of the order of ____.
- a) 550 to 560 °C b) 210 to 240 °C c) 340 to 370 °C d) 400 to 450 °C
39. The maximum back pressure allowed for DG sets is in the range of ____.
- a) 100 – 200 mm WC b) 250 – 300 mm WC
c) 400 – 500 mm WC d) above 500 mm WC
40. The operating efficiency of DG set also depends on:
- a) turbo charger b) Inlet air temperature c) % loading d) all the above
41. For a DG set, the copper losses in the alternator are proportional to the:
- a) Current delivered by the alternator
b) Square of the current delivered by the alternator
c) Square root of the current delivered by the alternator
d) None of the above
42. The jacket cooling water temperature for DG sets should be in the range of _____
- a) 40 – 50° C b) 30 – 40°C c) 80 – 90°C d) 45 – 60°C
43. The main precaution to be taken care by the waste heat recovery device manufacture to prevent the problem in DG set during operation is:
- a) Temperature raises b) Back pressure
c) Over loading of waste heat recovery tubes d) Turbulence of exhaust gases

6. PUMPS

- 1 If pump delivers no liquid, then probable cause is

(a) Lack of prime	(b) Gas or air in liquid
(c) Bent shaft	(d) Moisture in lubricating oil

- 2 If pump discharge pressure is low, then probable cause is

(a) Lack of prime	(b) Gas or air in liquid
(c) Bent shaft	(d) Moisture in lubricating oil

- 3 If there is excessive vibration in pump, then probable cause is

(a) Lack of prime	(b) Gas or air in liquid
(c) Bent shaft	(d) Moisture in lubricating oil

- 4 If the bearing of pump overheats, then probable cause is

(a) Lack of prime	(b) Gas or air in liquid
(c) Bent shaft	(d) Moisture in lubricating oil

- 5 If pump overloads the driver, then probable cause is

(a) Packing too tight	(b) Suction line not filled with liquid
(c) Gas or liquid in air	(d) None of the above

- 6 Which of the following is not a criteria of pump selection

(a) Type of duty required	(b) Details of head
(c) Duration of availability of power supply	(d) The look of pump.

7. HS Pump works with suction head.

(a) 15-20 feet head	(b) 21-40 feet head
(c) 41-80 feet head	(d) None of the above.

8. VS Pump works with total head

(a) Upto 46 Mtrs. head.	(b) 46-70 Mtrs. head
(c) 70-100 Mtrs. Head	(d) None of the above

9. Motor of the VS pump is located

(a) Above the ground level	(b) Below the ground level
(c) Deep in the bore	(d) None of the above

10. Line shaft of the VS pump is lubricated

(a) Spindle oil	(b) Diesel oil
(c) Lub oil SAE-40/30	(d) None of the above

11. Priming is required for

(a) HS Pump	(b) VS Pump	(c) Submersible Pump
-------------	-------------	----------------------

12. RPM of submersible pump set is
(a) 440 (b) 1440 (c) 380 (d) 2800
13. Which pump is most suitable for deep & titled bore
(a) HS Pump (b) VS Pump (c) Submersible (d) Jet pump
(e) None of above.
14. Redevelopment of bore is done
a) For smooth operation of pump
b) For taking good yield for bore
c) To maintain long life of bore
d) To avoid the frequent failure of the pump
e) All of above.
15. Capacity of pump set is selected on the ground of
a) Yield, Static-water-level, Working-water-level.
b) Location of bore
c) Type of starter provided
d) Quantity of water to be used.
16. Pump fails mostly due to
a) Less working
b) Excessive working
c) Incorrect operation
d) Failure of pump
17. Pump set motor burns due to
a) Single phasing
b) Reverse phasing
c) Over loading for a shorter period
d) None of above.
18. For a 10 HP pump set which type of starter is suitable
(a) DOL (b) Start Delta (c) Auto Transformer
(d) None of the above
19. A 5 HP pump set draws current on full load
(a) 5 A (b) 10 A (c) 7.5 A (d) 6 A
20. Ammeter is provided in control panel of pump set to measure the
(a) Voltage (b) Frequency (c) Power Factor (d) Current
21. No. of contractors provided in star-delta starter
(a) 1 (b) 2 (c) 3 (d) 4

22. Pump Guard functions to protect the submersible pump set against
- Single Phasing
 - Reverse Phasing
 - Over Loading
 - Dry Running
 - All of above.
23. Automation of pump set is done to
- To limit the working of pumps
 - To avoid the working of water
 - To save the electrical energy
 - To reduce the man power
 - All of the above.
24. Centralized control of pumps means
- Operation of pump from individual pump houses
 - Operation of all pumps from a single location
 - None of the above
25. The functional head due to flow of water in the pipe line---- length of piping system.
- | | |
|---------------------------------|------------------------------|
| (a) Inversely proportional to | (b) Directly proportional to |
| (c) Constant and independent of | (d) None of the above. |
26. The functional head due to flow of water in the pipe line---- Diameter of pipe.
- Inversely proportional to
 - Directly proportional to
 - Constant and independent of
 - None of the above.
27. The functional head due to flow of water in pip line is directly proportional to---- of water.
- Velocity
 - (Square root of) Velocity
 - 1 / Velocity
 - Velocity²
28. The average of velocity of water in the suction pipe --- the delivery pipe.
- Less than in
 - More than in
 - Same as in
 - None of the above.
29. Theoretically the maximum suction head for ordinary centrifugal pumps should not exceed.
- | | | | |
|-------------|-------------|-------------|-------------|
| (a) 20 feet | (b) 34 feet | (c) 10 feet | (d) 5 feet. |
|-------------|-------------|-------------|-------------|

30. For vertical shaft pump and submersible pumps the suction head is always.
(a) Positive (b) Negative (c) Zero (d) None of the above.
31. The motor of vertical shaft, 75 HP rating pump is.
(a) Force air cooled (b) Natural air cooled
(c) Water cooled. (d) None of the above.
32. The specific speed of pump (in RPM) is the speed at which the impeller would run to give discharge of --- against head of ----
(a) 1 GPM, 1 Foot
(b) 1 GPH, 1 Foot
(c) 1 GPM, 34 feet
(d) 1 GPH, 34 feet
33. The specific speed of pump is directly proportional to ---- where 'Q' is rate of discharge in GPH.
(a) (Square root) Q (b) Q
(c) Q^2 (d) None of the above.
34. The specific speed of pump is directly proportional to --- where 'N' is speed of pump in RPM.
(a) Square root (N) (b) N
(c) N^2 (d) None of the above.
35. Positive displacement pumps are generally less efficient than centrifugal pumps. State whether the statement is true or false
(a) True (b) False
36. Installing larger diameter pipe in pumping system results in reduction in-----
a) static head b) frictional head c) both a and b d) neither a nor b
37. Generally water pipe lines are designed with water velocity of
a) < 1 m/s b) up to 2.0 m/s c) > 2 m/s d) None of the above
38. What is the impact on flow and pressure when the impeller of a pump is trimmed?
a) Flow decreases with increased pressure b) Both flow and pressure increases
c) Both pressure and flow decreases d) None of the above
39. For high flow requirement, pumps are generally operated in
a) parallel b) series c) any of the above d) none of the above

40. "In case of throttling operation, the pump has to overcome additional pressure in order to deliver the reduced flow". Please indicate whether this statement is
(a) True (b) False
41. Friction losses in a pumping system is-----
a) proportional to $1/Q$ b) proportional to $1/Q^2$
c) proportional to $1/Q^3$ d) proportional to $1/Q^4$
42. For large capacity centrifugal pumps, design efficiencies are in the range of
a) around 70% b) around 85% c) around 95% d) any of above
43. The moving part in centrifugal pump is -----
a) impeller b) diffuser c) both a & b d) neither a nor b
44. The most efficient method of flow control in a pumping system is-----
a) Throttling the flow b) Speed control c) Impeller trimming d) None
45. In case of increased suction lift from open wells, the delivery flow rate-----
a) increases b) decreases c) remains same d) none of the above
46. Pump efficiency generally increases with specific speed. State whether the statement is True or False.
(a) True (b) False
47. Throttling the delivery valve of a pump results in increased _____.
a) head b) power c) both (a) and (b) d) either (a) or (b)
48. The operating point in a pumping system is identified by
a) Point of intersection of system curve and efficiency curve
b) Point of intersection of pump curve and theoretical power curve
c) Point of intersection of pump curve and system curve
d) Cannot be decided by pump characteristic curves
49. The intersection point of the pump curve and the system curve is called-----
a) Pump efficiency b) Best efficiency point
c) System efficiency d) None of the above
50. If the speed of a centrifugal pump is doubled, its power consumption increases by----- times.
a) two b) four c) eight d) no change

51. Installation of Variable frequency drives (VFD) allows the motor to be operated with ____.
- a) lower start-up current
 - b) higher start-up current
 - c) constant current
 - d) none of the above
52. In case of centrifugal pumps, impeller diameter changes are generally limited to reducing the diameter to about ____ of maximum size.
- a) 75%
 - b) 50%
 - c) 25%
 - d) None of the above
53. If the delivery valve of the pump is throttled such that it delivers 30% of the rated flow, one of the best options for improved energy efficiency would be
- a) Trimming of the impeller
 - b) Replacing the motor
 - c) Replacing the impeller with a smaller size impeller
 - d) None of the above
54. Small by-pass lines are installed some times to ____.
- a) control flow rate
 - b) control pump delivery head
 - c) prevent pump running at zero flow
 - d) reduce pump power consumption

7. TRACK CROSSINGS

- 1 The minimum height above rail level of the lowest portion of any conductor of 11 kV to 66 kV overhead lines crossing (including guard wire) the railway track should be
 - (a) 14.1 m
 - (b) 14.6 m
 - (c) 15.4 m
 - (d) 17.9 m
- 2 The minimum height above rail level of the lowest portion of any conductor of 66 kV to 132 kV overheads lines crossing the railway track should be
 - (a) 14.1 m
 - (b) 14.6 m
 - (c) 15.4 m
 - (d) 17.9 m
- 3 The minimum depth of underground cable track crossing (through) pipe should be
 - (a) 1 m
 - (b) 1.5 m
 - (c) 2 m
 - (d) 2.5 m
- 4 The Electrical Inspector at zonal railway is
 - (a) CEE
 - (b) Dy. CEE
 - (c) DRM (Elect.)
 - (d) CESE.
- 5 The regulations for electrical line crossing on railway track is not applicable to
 - (a) Crossing of railway track laid underground/ inside tube and tunnels
 - (b) 1500 V DC traction system
 - (c) 25 kV, 50 Hz traction systems
 - (d) All of the above
- 6 In special cases the reduction in specified clearance of electrical crossing on railway track can be permitted by
 - (a) Electrical Inspector
 - (b) Astd. Electrical Inspector
 - (c) DRM
 - (d) ADRM
- 7 In view of electrical lines crossing on railway tracks the materials used should comply with Indian Standards specifications but where these are not available, which of the following should be followed
 - (a) British standard specifications
 - (b) US standard specifications
 - (c) Russian standard specifications
 - (d) France standard specifications
- 8 Electrical crossings on railway tracks should be inspected by the owner at an interval not exceeding
 - (a) 3 months
 - (b) 6 months
 - (c) 9 months
 - (d) 12 months
- 9 If at instance of railways any electrical crossing on railway track is to be shifted or modified the cost will be borne by ___ (shifting not foreseen at the time of agreement)
 - (a) Owner
 - (b) Railways
 - (c) Both
 - (d) Either a or b

- 10 In case of defects and failures in electrical crossing on railway tracks, owner has to send a detailed report to all the authorities mentioned in the regulations, within _____ hrs of the first report
(a) 12 (b) 24 (c) 36 (d) 48
- 11 Angle of overhead electrical line crossing to railway track shall be
(a) Right angle
(b) Acute angle
(c) Obtuse angle
(d) Angle does not matter.
- 12 In special cases the maximum permitted deviation in angle of OH electrical line crossing to railway track shall be
(a) 10 deg (b) 20 deg (c) 30 deg (d) 45 deg
- 13 The minimum distance of structures (for electrical line crossing) from the centre of nearest railway track shall be equal to the height of the structure in meters plus
(a) 3 m (b) 6 m (c) 9 m (d) 12 m
- 14 The span of the OH electrical line crossing the railway track is restricted to
(a) 100 m (b) 200 m (c) 300 m (d) 400 m
- 15 The minimum height above rail level of the lowest portion of any conductor of 132kV to 220kV overhead lines crossing (including guard wire) the railway track should be
(a) 14.1 m (b) 14.6 m (c) 15.4 m (d) 17.9 m
- 16 The minimum height above rail level of the lowest portion of any conductor of 220kV to 400kV overhead lines crossing (including guard wire) the railway track should be
(a) 14.1 m (b) 4.6 m (c) 15.4 m (d) 17.9 m
- 17 In special circumstances if the railway crane has to work under the under the overhead electrical line crossing, the minimum clearance between the highest point of the jib and the lowest conductor of the 33 kV lines should be
(a) 1.5 m (b) 2 m (c) 2.25 m (d) 2.5 m
- 18 In special circumstances if the railway crane has to work under the under the overhead electrical line crossing, the minimum clearance between the highest point of the jib and the lowest conductor of the 66 kV lines should be
(a) 1.5 m (b) 2 m (c) 2.25 m (d) 2.5 m
- 19 In special circumstances if the railway crane has to work under the under the overhead electrical line crossing, the minimum clearance between the highest point of the jib and the lowest conductor of the 110kV lines should be
(a) 1.5 m (b) 2 m (c) 2.25 m (d) 2.5 m

- 20 In special circumstances if the railway crane has to work under the under the overhead electrical line crossing, the minimum clearance between the highest point of the jib and the lowest conductor of the 132kV lines should be
(a) 1.5 m (b) 2 m (c) 2.25 m (d) 2.5 m
- 21 In special circumstances if the railway crane has to work under the under the overhead electrical line crossing, the minimum clearance between the highest point of the jib and the lowest conductor of the 220kV lines should be
(a) 2.25m (b) 2.5 m (c) 3.5 m (d) 6.0 m
- 22 In special circumstances if the railway crane has to work under the under the overhead electrical line crossing, the minimum clearance between the highest point of the jib and the lowest conductor of the 400kV lines should be
(a) 2.25m (b) 2.5m (c) 3.5 (d) 6.0 m
- 23 In sections where tracks are not to be electrified in future,lines upto 11 kV overhead crossing are permitted with clearance between lowest conductor of the line and railway track
(a) 9 m (b) 10.95 m (c) 11.05 m (d) 12.1 m
- 24 The factor of safety of each string of insulator used for overhead electrical crossing on railway track should not be less than
(a) 1 (b) 2 (c) 3 (d) 4
- 25 The minimum height between any guard wire and a live conductor of electrical crossing on railway track shall not be less than
(a) 1 m (b) 1.5 m (c) 2 m (d) 2.5 m
- 26 Each structure on either side of the railway track, supporting the span of overhead electrical line crossing should be provided with_____ no. of independent earths
(a) 1 (b) 2 (c) 3 (d) 4
- 27 The maximum permissible earth resistance on either side of the electrical overhead line crossing (on railway track) is
(a) 5 ohm (b) 8 ohm (c) 10 ohm (d) 12 ohm
- 28 The owner of the overhead electric line crossing on railway tracks, is required to inspect and test the earth on hot dry day at an interval of
(a) 3 months (b) 6 months (c) 9 months (d) 12 months
- 29 Which of the following should be displayed on the marker at each end of the underground cable crossing on railway track
(a) No. of cables (b) Size of cable
(c) Make of cables (d) All of the above

- 30 Which of the following data is to be provided by the owner, while proposing for overhead electrical line crossing on railway track
- (a) Temperature data provided
 - (b) Name of supervisor from owner's side
 - (c) Life of crossing
 - (d) None of the above.
- 31 The final authority to grant the approval for proposed electrical line crossing on railway track
- (a) Electrical Inspector
 - (b) DRM
 - (c) DRM (Elect.)
 - (d) ADRM

8. INDIAN ELECTRICITY RULES

- 1 The maximum variation allowed in voltage of LV & MV AC supply is
(a) $\pm 2\%$ (b) $\pm 3\%$ (c) $\pm 4\%$ (d) $\pm 5\%$
- 2 The maximum variation allowed in voltage of HV & EHV AC supply is
(a) $\pm 8.5\%$ (b) $\pm 10.5\%$ (c) $\pm 12.5\%$ (d) $\pm 14.5\%$
- 3 The maximum variation allowed in frequency of AC supply is
(a) $\pm 2\%$ (b) $\pm 3\%$ (c) $\pm 4\%$ (d) $\pm 5\%$
- 4 Clearance of the lowest conductor (across the street) from the ground for LT and MT lines should be
(a) 17 ft. (b) 18 ft. (c) 19 ft. (d) 20 ft.
- 5 Clearance of the lowest conductor (across the street) from the ground for HT lines should be
(a) 17 ft. (b) 18 ft. (c) 19 ft. (d) 20 ft.
- 6 Clearance of the lowest conductor (along the street) from the ground for LT and MT lines should be
(a) 17 ft. (b) 18 ft. (c) 19 ft. (d) 20 ft.
- 7 Clearance of the lowest conductor (along the street) from the ground for HT lines should be
(a) 17 ft. (b) 18 ft. (c) 19 ft. (d) 20 ft.
- 8 Clearance of the lowest conductor vertical above the building for LT and MT lines should be
(a) 4 ft. (b) 6 ft. (c) 8 ft. (d) 12 ft.
- 9 Clearance of the lowest conductor vertical above the building for HT lines should be
(a) 4 ft. (b) 6 ft. (c) 8 ft. (d) 12 ft.
- 10 Clearance of the conductor Horizontal from the building for LT and MT lines should be
(a) 4 ft. (b) 6 ft. (c) 8 ft. (d) 12 ft.
- 11 Clearance of the conductor Horizontal from the building for HT lines should be
(a) 4 ft. (b) 6 ft. (c) 8 ft. (d) 12 ft.
- 12 The on line vertical spacing between the conductors for 400/230 V, 150 ft. span lines should be
(a) 1'3" (b) 1'6" (c) 2' (d) 2'6"

- 13 The on line vertical spacing between the conductors for 400/230 V, 150-250 ft. span lines should be
(a) 1'3" (b) 1'6" (c) 2' (d) 2'6"
- 14 The on line vertical spacing between the conductors for 11 kV lines should be
(a) 1'3" (b) 1'6" (c) 2' (d) 2'6"
- 15 The on line horizontal spacing between the conductors for 400/230 V, 150 ft. span lines should be
(a) 1'3" (b) 1'6" (c) 2' (d) 2'6"
- 16 The on line horizontal spacing between the conductors for 400/230 V, 150-250 ft. span lines should be
(a) 1'3" (b) 1'6" (c) 2' (d) 2'6"
- 17 The on line horizontal spacing between the conductors for 11 kV lines should be
(a) 1'3" (b) 1'6" (c) 2'6" (d) 3'9"
- 18 The clearance between the conductor and pole for 400/230 V, 150 ft span lines, should be
(a) 6" (b) 9" (c) 12" (d) 1'3"
- 19 The clearance between the conductor and pole for 400/230 V, 150-250 ft span lines, should be
(a) 6" (b) 9" (c) 12" (d) 1'3"
- 20 The clearance between the conductor and pole for 11 kV lines, should be
(a) 6" (b) 9" (c) 12" (d) 1'3"

9. POLICY

- 1 Provision of rebate by state electricity authority is applicable if the power factor is kept above
 (a) 0.9 (b) 0.92 (c) 0.95 (d) 0.98
2. Penalty is imposed by state electricity authority if the power factor is below
 (a) 0.9 (b) 0.92 (c) 0.95 (d) 0.98
- 3 Electric energy charges from the railway employees residing in railway colonies are at
 (a) Flat rate
 (b) Fixed rate
 (c) Average consumption
 (d) The rate that of local supply authority
- 4 Electric energy charges from the staff/ teachers of Kendriya Vidhyalaya residing in railway colonies is at
 (a) Flat rate
 (b) Fixed rate
 (c) Average consumption
 (d) The rate applicable to railway employees
- 5 Electric energy charges from the social welfare organizations such as railway institute, community halls, clubs, etc. is at
 (a) Flat rate
 (b) Fixed rate
 (c) Average consumption
 (d) The rate applicable to railway employee subject to maximum limit of consumption.
- 6 Electric energy charges from the religious buildings (electric supply fed by railway) such as temples. Mosque etc is at
 (a) Flat rate
 (b) Fixed rate
 (c) Average consumption
 (d) The rate that of local supply authority
- 7 Per day charges from officers on duty (entitled to 1st class AC travel) for occupation of air conditioned accommodation on railway rest house is Rs.
 (a) 3 (b) 5 (c) 6 (d) 7
- 8 Per day charges from officers on leave (entitled to 1st class AC travel) for occupation of air conditioned accommodation on railway rest house is prescribed room rent plus Rs.
 (a) 3 (b) 5 (c) 6 (d) 7
- 9 Per day charges from officers on duty (entitled to 1st class AC travel) for occupation of air conditioned accommodation on railway rest house during winter season is Rs.
 (a) 3 (b) 5 (c) 6 (d) No charges

- 10 The firms dealing with coin operated person weighing machines has to deposit security money equivalent to
(a) One month electric charges
(b) Two month electric charges
(c) Three month electric charges
(d) No charges.
- 11 The private parties applying for electric connection from railways has to deposit security money equivalent to
(a) One month electric charges
(b) Two month electric charges
(c) Three month electric charges
(d) No charges.
- 12 As per Railway Board recommendations, following are to be connected with DG set supply
(a) Vacuum testing plants
(b) Water coolers on platforms
(c) Hospital with operation theatre
(d) All of the above.
- 13 As per Railway Board recommendations, the stations/ halts should be electrified, where the electric supply is available within
(a) 1 km (b) 1.5 km (c) 2 km (d) 2.5 km
- 14 The porters rest centres are treated as
(a) Service building (b) Private building
(c) Passenger amenity (d) None of the above
- 15 As per Indian Electricity Act, penalty against unauthorised electricity connection is
(a) Imprisonment up to 3 yrs and fine up to Rs. 1000/-
(b) Imprisonment up to 2 yrs and fine up to Rs. 1000/-
(c) Imprisonment up to 3 yrs and fine up to Rs. 1500/-
(d) Imprisonment up to 2 yrs and fine up to Rs. 1500/-
- 16 Number of geysers that can be provided in officer's flat (on special request)
(a) 1 (b) 2 (c) 3 (d) 4
- 17 Number of geysers that can be provided in the GM's bungalow is
(a) 1 (b) 2 (c) 3 (d) 4
- 18 The railway stations at zonal headquarters and state capitals are classified as of category
(a) A (b) B (c) C (d) D

- 19 The railway stations at divisional headquarters and district headquarters are classified as of category
 (a) A (b) B
 (c) C (d) D
- 20 As per Railway Board recommendations, the light fittings for platform on category A and B stations are
 (a) 1 x 36 W FL tube (b) 2 x 36 W HPSV
 (c) 1 x 70 W HPSV (d) 2 x 36 W HPSV
- 21 As per Railway Board recommendations, the light fittings for platform on category C stations are
 (a) 1 x 36 W FL tube (b) 2 x 36 W HPSV
 (c) 1 x 70 W HPSV (d) 2 x 36 W HPSV
- 22 As per Railway Board recommendations, the light fittings for ASM office, SM office, enquiry and PRS on category A and B stations are
 (a) 2 x 36 W mirror optic FL tube (b) 4 x 36 W mirror optic FL tube
 (c) 2 x 36 W box type FL tube (d) 4 x 36 W box type FL tube
- 23 As per Railway Boards recommendations, the light fittings in station approach and car parks are
 (a) 1 x 70 W HPSV (b) 2 x 70 W HPSV
 (c) 1 x 40 W Box type (d) 2 x 40 W box type
- 24 As per Railway Board recommendations, on platform having width of 9-6 m, fannage should be provided in
 (a) 1 row (b) 2 rows (c) 3 rows (d) 4 rows
- 25 As per Railway Board recommendations, on platform having width more than 9 m, fannage should be provided in
 (a) 1 row (b) 2 rows (c) 3 rows (d) 4 rows
- 26 As per Railway Board recommendations, the sweep of fans provided on platforms should be
 (a) 800 mm (b) 1200 mm (c) 1500 mm (d) 1800 mm
- 27 As per Railway Board recommendations, the sweep of fans provided in offices, waiting hall etc. should be
 (a) 800 mm (b) 1200 mm (c) 1500 mm (d) 1800 mm
- 28 As per Railway Board recommendations, the sweep of fans provided in retiring rooms on each bed should be
 (a) 800 mm (b) 1200 mm (c) 1500 mm (d) 1800 mm
- 29 At stations where neither electrical supervisor nor engineering supervisor is headquartered, the upkeep of pumps in water supply system is under
 (a) S & T supervisor (b) Station Master (c) Gangman (d) Pointsman

- 30 State Electricity Board charges Electricity Duty against selling electricity to railways amounting Rs.
(a) 10,000/- (b) 50,000/- (c) 75,000/- (d) No charges
- 31 Railway Board has recommended that locations where HPSV lamps affect the colour light signalling should be replaced by
(a) Mercury Vapour Lamps
(b) FL tube fittings
(c) Any of A & B
(d) No such recommendation has been made.
- 32 The maintenance of water coolers donated by private parties is to be done by
(a) The donating party
(b) Railways
(c) On contract
(d) Any of the above.
- 33 The electrical energy consumption on water coolers donated by private parties are to be borne by
(a) The donating party
(b) Railways
(c) SEB
(d) Through collection from public
- 34 The Railway Board has recommended to provide water coolers at stations with _____ passengers (inward & outward) per day
(a) 500 (b) 1000 (c) 1500 (d) 2000

10. ELECTRICAL UNITS: EQUIVALENTS & FORMULAE

1. One HP =

(a) 756 watts	(b) 746 watts	(c) 860 watts	(d) 856 watts
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2. Torque in ft. lbs. =

(a) $HP \times 33000 / (RPM \times 2)$	(b) $HP \times 2 / (RPM \times 33000)$
(b) $HP \times RPM / (2 \times 33000)$	(d) $RPM \times 2 / (HP \times 33000)$

3. Current =

(a) Watts/Volts	(b) Volts/Watts
(c) Kilowatt/Volts	(d) Kilovolt/watt

4. Motor output in HP=

(a) $KW \text{ input} \times \text{efficiency} / 0.746$	(b) $KW \text{ input} \times 0.746 / \text{efficiency}$
(c) $\text{Efficiency} \times 0.746 / KW \text{ input}$	(d) $0.746 / (KW \text{ input} \times \text{efficiency})$

5. kVA equal to

(a) $1000 \times \text{Amps} / \text{volts}$	(b) $\text{volts} \times \text{Amps} \times 1000$
(c) $\text{Volts} \times 1000 / \text{Amps}$	(d) $\text{Amps} \times \text{volts} / 1000$

6. Power factor =

(a) $\text{True Power} / \text{Apparent power}$	(b) $\text{Apparent power} / \text{True power}$
(c) $\text{Average power} / \text{True power}$	(d) $\text{Apparent power} / \text{Average power}$

7. True power in three-phase circuit in Kilowatt is

(a) $1.414 \times \text{volts} \times \text{amperes} \times \text{pf} / 1000$	(b) $1.73 \times \text{volts} \times \text{amperes} \times \text{pf} / 1000$
(c) $\text{Volts} \times \text{Amperes} \times \text{pf} / 1000$	(d) $\text{Volts} \times \text{Amperes} \times 1000 / \text{pf}$

8. Amperes drawn by single-phase motor are equal to

(a) $\text{Efficiency} \times \text{Volts} \times \text{pf} / (HP \times 746)$	(b) $\text{Efficiency} \times \text{pf} / (\text{volt} \times HP \times 746)$
(c) $HP \times 746 / (\text{Efficiency} \times \text{volts} \times \text{pf})$	(d) $HP \times 746 \times \text{volts} / (\text{Efficiency} \times \text{pf})$

9. Amperes drawn by three phase motor are equal to

(a) $\text{Efficiency} \times \text{Volts} \times \text{pf} / (HP \times 746)$	(b) $\text{Efficiency} \times \text{pf} / (\text{volt} \times HP \times 746)$
(c) $HP \times 746 / (\text{Efficiency} \times \text{volts} \times \text{pf} \times 1.73)$	(d) $HP \times 746 \times \text{volts} / (\text{Efficiency} \times \text{pf})$

10. One Kilowatt =

(a) 1.314 HP	(b) 13.41 HP	(c) 134.1 HP	(d) 1341 HP
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11. One Kilowatt =

(a) 1360 Metric HP	(b) 136 Metric HP
(c) 13.60 Metric HP	(d) 1.360 Metric HP

12. One Kwh =

(a) 34.13 BTU	(b) 44.13 BTU
(c) 3.413 BTU	(d) 4.413 BTU

13. One Kwh =
(a) 1000 calories (b) 860 calories (c) 740 calories (d) 970 calories
14. One BTU =
(a) 0.2520 calories (b) 2.520 calories (c) 25.20 calories (d) 252.0 calories
15. One Calorie =
(a) 39.68 BTU (b) 4.968 BTU (c) 49.68 BTU (d) 3.968 BTU
16. One foot pound =
(a) 0.1383 M Kg (b) 1.383 M Kg (c) 13.83 M Kg (d) 138.3 M Kg
17. One BTU =
(a) 0.1076 M Kg (b) 1.076 M Kg (c) 10.76 M Kg (d) 107.6 M Kg
18. One Kilowatt =
(a) 202 M Kg/sec (b) 102 M Kg /sec (c) 20.2 M Kg/sec (d) 10.2 M Kg/sec
19. One Electrical Unit =
(a) 1 Kwh (b) 1 Kw (c) 1 kVA (d) Watt
20. Power factor =
(a) R/Z (b) Z/R (c) V/I (d) I/V
21. The current rating of PVC insulated and PVC sheathed four core , armoured aluminium cable of size 120 sq mm (laid direct in ground) is approximately
(a) 80 amps (b) 185 amps (c) 290 amps (d) 320 amps
22. The current rating of PVC insulated and PVC sheathed four core , armoured aluminium cable of size 70 sq mm (laid in duct) is approximately
(a) 115 amps (b) 210 amps (c) 290 amps (d) 350 amps
23. The current rating of PVC insulated and PVC sheathed four core , armoured aluminium cable of size 50 sq mm (laid in air) is approximately
(a) 65 amps (b) 105 amps (c) 200 amps (d) 250 amps
24. The current rating of PVC insulated and PVC sheathed four core , armoured aluminium cable of size 35 sq mm (laid direct in ground) is approximately
(a) 92 amps (b) 160 amps (c) 200 amps (d) 250 amps
25. The current rating of PVC insulated and PVC sheathed four core , armoured aluminium cable of size 25 sq mm (laid direct in ground) is approximately
(a) 55 amps (b) 76 amps (c) 90 amps (d) 150 amp

11. INDUCTION MOTOR

1. Which of the following component is usually fabricated out of silicon steel ?
 - a. Bearings
 - b. Shaft
 - c. Stator core
 - d. None of the above
2. The frame of an induction motor is usually made of
 - a. Silicon steel
 - b. cast iron
 - c. aluminium
 - d. bronze
3. The shaft of an induction motor is made of
 - a. high speed steel
 - b. stainless steel
 - c. carbon steel
 - d. cast iron
4. In squirrel cage induction motors, the rotor slots are usually given slight skew in order to
 - a. reduce windage losses
 - b. reduce eddy currents
 - c. reduce accumulation of dirt and dust
 - d. reduce magnetic hum
5. In case the air gap in an induction motor is increased
 - a. the magnetizing current of the rotor will decrease
 - b. the power factor will decrease
 - c. speed of motor will increase
 - d. the windage losses will increase
6. In N_s is the synchronous speed and s the slip, then actual running speed of an induction motor will be
 - a. N_s
 - b. $s.N_s$
 - c. $(1-s)N_s$
 - d. $(N_s-1)s$
7. Slip rings are usually made of
 - a. copper
 - b. carbon
 - c. phosphor bronze
 - d. aluminium
8. The efficiency of an induction motor can be expected to be nearly
 - a. 60 to 90%
 - b. 80 to 90%
 - c. 95 to 98%
 - d. 99%
10. The number of slip rings on a squirrel-cage induction motor is usually
 - a. low
 - b. negligible
 - c. same as full-load torque
 - d. slightly more than full-load torque
11. Star-delta starting of motors is not possible in case of
 - a. single phase motors
 - b. variable speed motors
 - c. low horse power motors
 - d. high speed motors
12. An induction motor with 1000 r.p.m. speed will have
 - a. 8 poles
 - b. 6 poles
 - c. 4 poles
 - d. 2 poles

13. The crawling in the induction motor is caused by
- low voltage supply
 - high loads
 - harmonics developed in the motor
 - improper design of machine
 - none of the above
14. It is advisable to avoid line starting of induction motor and use starter because
- motor take five to seven time its full load current
 - it will pick up very high speed and may go out of step
 - it will run in reverse direction
 - starting torque is very high
15. Rotor rheostat control method of speed control is used for
- squirrel-cage induction motors only
 - slip ring induction motors only
 - both (a) and (b)
 - none of the above
16. If any two phases for an induction motor are interchanged
- the motor will run in reverse direction
 - the motor will run at reduced speed
 - the motor will not run
 - the motor will burn
17. An induction motor is
- self-starting with zero torque
 - self starting with high torque
 - self starting with low torque
 - non self starting
18. In three-phase squirrel-cage induction motors
- rotor conductor ends are short-circuited through slip rings
 - rotor conductors are short-circuited through end rings
 - rotor conductors are kept open
 - rotor conductors are connected to insulation
19. In a three-phase induction motor, the number of poles in the rotor winding is always
- zero
 - more than the number of poles in stator
 - less than number of poles in stator
 - equal to number of poles in stator
20. DOL starting of induction motors is usually restricted to
- low horsepower motors
 - variable speed motors
 - high horsepower motors
 - high speed motors
21. The power factor of an induction motor under no-load conditions will be closer to
- 0.2 lagging
 - 0.2 leading
 - 0.5 leading
 - unity
22. Size of a high speed motor as compared to low speed motor for the same H.P. will be
- bigger
 - smaller
 - same
 - any of the above

23. Slip ring motor is recommended where
- speed control is required
 - frequent starting, stopping and reversing is required
 - high starting torque is needed
 - all above features are required
24. Which type of bearing is provided in small induction motors to support the rotor shaft
- ball bearings
 - cast iron bearings
 - bush bearings
 - non of the above
25. Lubricant used for ball bearing is usually
- graphite
 - grease
 - mineral oil
 - molasses
26. If the rotor circuit of a squirrel cage induction motor is open, the rotor will
- run at very high speed
 - run at very low speed
 - make noise
 - not run
27. The advantage of a slip-ring induction motor over a squirrel cage induction motor is that
- it has higher efficiency
 - it has higher power factor
 - it can be started with help of rotor resistance stater
 - non of the above
28. A 3-phase slip-ring induction motor is always started with
- a starting winding
 - squirrel cage winding
 - no external resistance in rotor circuit
 - full external resistance in rotor circuit
29. The synchronous speed of a 3- phase induction motor is given by the formula
- $N_s = 120f/P$
 - $N_s = 120P/f$
 - $N_s = 120 fP$
 - $N_s = f P/120$
30. If single-phasing occurs on the running position in an induction motor, the motor will
- fail to carry load
 - produce peculiar noise
 - draw unbalanced and excessive currents
 - not start
31. A pump induction motor is switched on to a supply 25 percent lower than its rated voltage. The pump runs; eventually
- the pump will get heated and consequently get damaged
 - the pup will stall after sometimes
 - the pump will continue to run at lower speed without damage
32. If there is an open circuit in the rotor of a squirrel cage induction motor
- rotor will overheat
 - line fuses will blow
 - motor will be noisy
 - motor will not start

33. The principle of operation of a 3-phase induction motor is most similar to that of
- transformer with a shorted secondary
 - synchronous motor
 - capacitor start induction run motor
 - repulsion start motor induction motor
34. The A.C. motor which would be best suited to drive a centrifugal pump for discharging a variable quantity of water against a fixed head is the
- repulsion motor
 - synchronous motor
 - squirrel cage
 - slip ring induction motor
35. Two of the power supply terminals to a 3-phase induction motor get inter-changed during reconnection after maintenance of the motor. When put back into service, the motor will
- get heated up and damaged
 - rotate in the same direction as it was prior to maintenance
 - fail to rotate
 - rotate in the reverse direction to that prior to maintenance
 - none of the above
36. The frame of an induction motor is made of
- carbon
 - closed grained cast iron
 - aluminium
 - stainless steel
37. Slip rings for induction motors are made of
- phosphor bronze
 - aluminium
 - carbon
 - cobalt steel
38. The shaft, on which the rotor of an induction motor is mounted is made of
- high speed steel
 - chrome vanadium steel
 - cast-iron
 - mild steel
 - aluminium
39. Which of the following type of bearing is generally used to support the rotor of an induction motor
- Ball bearing
 - Needle bearing
 - Plummer block
 - Bush bearing
40. Under which method of starting an induction motor is expected to take largest starting current?
- star-delta starting
 - auto-transformer starting
 - direct on line starting
 - stator rotor starting
41. The direction of rotation of a 3-phase induction motor can be reversed by
- interchanging any two phases
 - supplying low voltage
 - reducing load
 - reducing frequency

42. The number of slip rings on a squirrel cage induction motor is
- four
 - three
 - two
 - none
43. The starting torque of the slip ring induction motor can be increased by
- adding resistance to the stator
 - adding resistance to the rotor
 - adding resistance to stator as well as the rotor
 - none of the above
44. If the rotor is open in a squirrel cage motor, it
- will run at very high speed
 - will run at very slow speed
 - will not run
 - will make noise
45. The value of average flux density in air gap in an induction motor, should be small
- to achieve good efficiency
 - to get poor power factor
 - to get good power factor
 - for minimum cost
46. An induction motor has a rated speed of 720 r.p.m. How many poles has its rotating magnetic field?
- 8 poles
 - 6 poles
 - 4 poles
 - 2 poles
47. During starting if an induction motor hums, the probable cause could be
- open circuit
 - unequal phase resistance
 - inter-turn short circuit on rotor
 - any of the above
48. The probable reason for an induction motor running too hot could be
- low voltage
 - uneven air gap
 - clogged ventilating ducts
 - any of the above
49. In case single phasing occurs in delta connected motor
- one phase will be seriously over-loaded and two others will be slightly overloaded
 - two phases will be seriously over-loaded and there will be no current in the third phase
 - there will be no current in one phases
 - there will be no current in two phases
50. Synchronous speed is defined as
- the speed of a synchronous motor
 - the natural speed at which a magnetic field rotates
 - the speed of the rotor of an induction motor
 - the speed of an induction motor at no load

51. The speed of three phase cage-rotor induction motor depends on
- a. number of poles only
 - b. input voltage
 - c. frequency of supply only
 - d. number of poles and frequency of supply
 - e. none of the above
52. The two important parts of a 3-phase induction motor are
- a. rotor and armature
 - b. rotor and stator
 - c. slip ring and brushes
 - d. stator and field
53. Phase advancers are used with induction motors to
- a. reduce noise
 - b. reduce vibrations
 - c. reduce copper losses
 - d. improve power factor

12. CABLES

1. The insulating material for a cable should have
 - a. low cost
 - b. high dielectric strength
 - c. high mechanical strength
 - d. all of the above
2. Which of the following protects a cable against mechanical injury
 - a. bedding
 - b. sheath
 - c. armouring
 - d. none of the above
3. Which of the following insulation is used in cables?
 - a. Varnished cambric
 - b. rubber
 - c. paper
 - d. any of the above
4. Empire tape is
 - a. varnished cambric
 - b. vulcanized rubber
 - c. impregnated paper
 - d. none of the above
5. The thickness of the layer on insulation on the conductor, in cables, depends upon
 - a. bedding
 - b. sheath
 - c. armouring
 - d. none of the above
6. The bedding on a cable consists of
 - a. Hessian cloth
 - b. jute
 - c. any of the above
 - d. none of the above
7. The insulating material for cables should
 - a. be acid proof
 - b. be non-inflammable
 - c. be non-hygroscopic
 - d. have all above properties
8. In a cable immediately above metallic sheath..... is provided
 - a. earthing connection
 - b. bedding
 - c. armouring
 - d. none of the above
9. In case of three core flexible cable the colour of the neutral is
 - a. blue
 - b. black
 - c. brown
 - d. none of the above
10. Low tension cables are generally used upto
 - a. 200 V
 - b. 500 V
 - c. 700 V
 - d. 1000 V

11. PVC stands for
- a. polyvinyl chloride
 - b. post varnish conductor
 - c. pressed and varnished cloth
 - d. positive voltage conductor
 - e. all above parameters
12. In the cables, the location of fault is usually found out by comparing
- a. the resistance of the conductor
 - b. the inductance of conductors
 - c. the capacitances of insulated conductors
 - d. all above parameters
13. The material for armouring on cable is usually
- a. steel tape
 - b. galvanized steel wire
 - c. any of the above
 - d. none of the above
14. In the cables, sheaths are used to
- a. prevent the moisture from entering the cable
 - b. provide enough strength
 - c. provide proper insulation
 - d. none of the above
15. Underground cables are laid at sufficient depth
- a. to minimize temperature stresses
 - b. to avoid being unearthed easily due to removal of soil
 - c. to minimize the effect of shocks and vibrations due to passing vehicles, etc.
 - d. for all of the above reasons
16. The advantage of cable over overhead transmission lines is
- a. easy maintenance
 - b. low cost
 - c. can be used in congested areas
 - d. can be used in high voltage circuits
17. The insulating material should have
- a. low permittivity
 - b. high resistivity
 - c. high dielectric strength
 - d. all of the above
18. The disadvantage with paper as insulating material is
- a. it is hygroscopic
 - b. it has high capacitance
 - c. it is an organic material
 - d. none of the above