

Abbreviations :

- 1) PWM : Pulse Width Modulation.
- 2) VRLA : Valve Regulated Lead Acid
- 3) IGBT : Insulated Gate Bi polar Transistor
- 4) FRPCPY : Failure Rate Percentage Per Year.
- 5) BTU : British Thermal Unit.
- 6) IOD : Injured On Duty.
- 7) LAP : Leave at Average Pay
- 8) LHAP : Leave at Half Average Pay
- 9) CL : Casual Leave
- 10) PNM : Permanent Negotiable Machinery
- 11) AIRF : All India Railway men federation.
- 12) NFIR : National Federation of Indian railways.
- 13) DA : Dearness allowance
- 14) TA : Traveling allowance or transportation allowance
- 15) LWP : Leave without pay
- 16) CCA : City compensatory allowance.
- 17) O.V.P. : Over Voltage Protector
- 18) R.P.M. : Revolutions per minute
- 19) A.C. : Alternating Current
- 20) D.C. : Direct Current
- 21) KWH : Kilowatt Hour
- 22) KVA : Kilo Volt Amps
- 23) KVAR : Kilo Volt Ampers Reactive
- 24) H.P. : Horse Power
- 25) A.H. : Ampere Hours
- 26) P.F. : Power Factor
- 27) R.P.M. : Revolutions per minute
- 28) E.H.T. : Extra High Tension
- 29) C/S : Cycles per second
- 30) A.T. : Auxiliary Transformer
- 31) L.E.D. : Light Emitting Diode
- 32) E.M.F. : Electro Motive Force
- 33) P.D. : Potential difference
- 34) S.D.B. : Sub-Distribution Board
- 35) M.C.B. : Miniature Circuit Breaker
- 36) O.C.B. : Oil Circuit Breaker
- 37) C.F.L. : Compact Fluorescent Lamp
- 38) U.P.S. : Un-interruptible Power Supply
- 39) L.T.U.G : Low Tension Under Ground
- 40) H.R.C. : High Rapturing Capacity
- 41) O.L.R. : Over Load Relay
- 42) L.V.R. : Low Voltage Relay
- 43) E.F.T. : Emergency Feeding Terminal
- 44) S.W.G. : Standard Wire Gauge

- 45) E.O.G. : End On Generation
- 46) Ah : Ampere Hour
- 47) L.M.S. : Load Master Switch
- 48) D.F.B. : Distribution Fuse Board
- 49) PNM : Permanent Negotiable Machine
- 50) RRU : Rectifier cum Regulator Unit
- 51) ERRU : Electronic Rectifier cum Regulator Unit
- 52) RJB : Roof Junction Box
- 53) ELU : Emergency Light Unit
- 54) PELE : Portable Emergency Lighting Equipment
- 55) MIG : Metal Inert Gas
- 56) MAG : Metal Active gas
- 57) TIG : Tungsten Inert Gas
- 58) PU PAINT : Poly Urethane Paint
- 59) CO₂ : Carbon dioxide
- 60) H₂O : Water

General English And Arithmetic

1. Mahatma Gandhi is the father of the Nation.
2. In a workshop discipline is essential to get maximum productivity.
3. I am proud to be a Railway men.
4. During Railway week celebrations awards are given to meritorious service.
5. Qutab Minar is the _____ monument in India [a]
a) tallest b) largest c) biggest d) none
6. Number of letters in English ? [b]
a) 56 b) 26 c) 54 d) 24
7. Number of vowels in English? [b]
a) 26 b) 5 c) 21 d) 12
8. Number of consonants in English? [c]
a) 56 b) 5 c) 21 d) none
9. The following terms are having spelling mistakes correct it [c]
a) alternator b) Rectifier c) Regeluter d) Junction box e) Rotary switch
10. The value of $(10.1+0.01+0.001)$ is [b]
a) 1.003 b) 10.111 c) 1.011 d) 1.001
11. Area of the square is equal to [c]
a) $2 \times$ sides b) $2 \times$ diagonals c) side \times side d) None
12. Perimeter of square is equal to [d]
a) length \times breadth b) $1/2$ (length \times breadth) c) 2 (length + breadth) d) $4 \times$ side
13. Do the following sum ? [14656]
 $8 + 32 + 340 + 4638 + 9638 = ?$
14. Do the following subtraction ? [3129]
 $3468 - 339 = ?$
15. Do the following multiplication ? [169813]
 $9989 \times (9 + 8) = ?$
16. Do the following division ? [120]
 $1080 \div 9 = ?$
17. An employee left $1/2$ of the property to his wife and the balance to his son. [6000]
If his property is Rs.12,000/- then share of his son is _____.

Hindi

1	Gazetted	:	राजपत्रित
2	Technician	:	यंत्रविद्
3	Complaint	:	आरोप
4	Inconvenience	:	असुविधा
5	Smoke	:	धुआं
6	Festival	:	त्यौहार
7	Holiday	:	छुट्टी
8	Absent	:	गैरहाजिर
9	Danger	:	खतरा
10	Master	:	प्रधान
11	Responsible	:	जिम्मेदार
12	Country	:	राष्ट्र
13	Accounts	:	लेखा
14	Department	:	विभाग
15	Personnel	:	कार्मिक

I. Multiple Choice Questions :

Power Maintenance

- 1) The quantity of electricity is measured in [a]
a) Ampere b) Ohm c) Volts d) Coulombs
- 2) The unit of potential difference is [a]
a) volt b) meter c) second d) Microfarad
- 3) The unit of resistance is [c]
a) Mho b) Pound/sec c) Ohm d) Henry
- 4) The unit of power is [c]
a) kilogram b) meter/sec c) watt d) ohm
- 5) What is DC ? [a]
a) It is a uni-directional current which changes its magnitude but not the directions
b) It is the current which changes its magnitude and direction periodically
c) The flow of electrons is called direct current
d) The obtained electric force in the circuit is called direct current
- 6) What type of instrument is used for measurement of resistance ? [d]
a) Voltmeter b) Energy meter c) Wattmeter d) Ohmmeter
- 7) Which instrument is used to measure the current ? [a]
a) Ammeter b) Energy meter c) Wattmeter d) Ohmmeter
- 8) Which instrument is used to measure the Electrical pressure ? [a]
a) Voltmeter b) Energy meter c) Ampere meter d) Ohmmeter
- 9) What is fuse ? [a]
a) To protect an electric circuit when the rated current exceeds in the circuit the field wire melts and open the circuit
b) To protect an electric circuit when the rated voltage exceeds in the circuit the field wire melts and open the circuit
c) To protect an electric circuit when the rated power exceeds in the circuit the field wire melts and open the circuit
d) None of these

- 10) Name the instrument which measures earth resistance ? [b]
a) Megger b) Earth merger c) Clamp meter d) AVO meter
- 11) What is the unit of the capacitor ? [b]
a) Henry b) Farad c) Joules d) Coulombs
- 12) What is rating of transformer ? [b]
a) RKVA b) KVA c) KW d) Hz
- 13) What is an Alternator ? [a]
a) It is a machine which converts mechanical energy into electrical energy
b) It is a machine which converts electrical energy into thermal energy
c) It is a machine which converts chemical energy into electrical energy
d) It is a machine which converts electrical energy into mechanical energy
- 14) What do you mean by Rectifier ? [a]
a) To convert from AC to DC b) To convert from DC to AC
c) To convert form AC to AC d) To convert from DC to DC
- 15) Why starter is used in fluorescent tube ? [b]
a) It gives surge voltage
b) Automatic make & break in the circuit for starting purpose
c) To limit the in rush current
d) To increase the efficiency of the tube
- 16) Why the choke is used with tube light ? [a]
a) To get the inductance thick or voltage surge at starting and limit the current in running
b) Automatic make and break in the circuit
c) To increase the efficiency of the tube
d) To save the filament from oxidizing
- 17) What do you mean by domestic air conditioner ? [b]
a) There is closed self conducted cooling unit in a cabinet
b) It produces the atmosphere conditions of human body, rest and efficiency
c) It controls the temperature of air into industrial units
d) None of these
- 18) Every room air conditioner consists of [d]
a) Compressor b) Condenser c) Evaporator d) All the above
- 19) The capacity of compressor motor used in 1.5 ton air conditioner is [d]
a) 1.0 HP b) 1.5 HP c) 2.0 HP d) 2.5 HP

- 20) The heating element of soldering iron is made of [c]
a) Silicon b) Copper c) Nichrome d) Iron
- 21) The tip of soldering iron is made of [d]
a) Steel b) Chromium c) Tin d) Copper
- 22) Cells are connected in series to [a]
a) Increase the output voltage b) Decrease the output voltage
c) Decrease the internal resistance d) Increase the current capacity
- 23) Cells are connected in parallel to [b]
a) Increase the output voltage b) Increase the current capacity
c) Increase the internal resistance d) Decrease the current capacity
- 24) Number of light points admissible in one circuit are [b]
a) 4 points of 40 W each b) 8 points of 40 W each c) 4 points of 1600 W each
d) 8 points of 200 W each
- 25) A lamp holder should be fixed from the ground level at a height of [a]
a) 1.83 meters b) 3 meters c) 2 meters d) 2.5 meters
- 26) How many light points are allowed in one circuit ? [a]
a) 8 Points b) 15 Points c) 20 Points d) Any number
- 27) A ceiling fan shall be hung at a height not less than _____ from the floor [c]
a) 2.5 mm b) 1.5 mm c) 3 m d) 1.75 mm
- 28) For a circuit rated for 5 amps, the correct tinned copper wire size will be [a]
a) 35 SWG b) 36 SWG c) 37 SWG d) 38 SWG
- 29) The earth conductor provides a path to ground for [a]
a) Leakage current b) Over current c) High voltage d) Circuit current
- 30) The fuse should be connected in _____ in the conductor [c]
a) Series, neutral b) parallel, neutral c) Series, live d) parallel, live
- 31) Fuse wire is not made of [d]
a) Copper b) Lead c) Aluminum d) Steel

- 32) Expansion the abbreviation of PVC [c]
a) Cab type sheathed b) Tough rubber sheathed c) Poly vinyl chloride
d) None the these
- 33) What meter is used for measuring the lighting ? [a]
a) Lux meter b) Multimeter c) Megger d) None of these
- 34) The purpose of overload protection in a motor circuit is to protect the motor [a]
a) from sustained over currents b) form earth leakage currents
c) from sustained over voltage d) from short circuits
- 35) A safety device in the electric circuit is called [a]
a) Fuse b) Relay c) Switch d) Regulator
- 36) What is called horse power (HP) ? [a]
a) 746 watts b) 770 watts c) 740 watts d) 1000 watts
- 37) Step-up transformer is used to decrease the voltage [b]
a) True b) False c) None of these
- 38) Transformer oil is used for [b]
a) Lubrication b) Insulation c) Cleaning d) Fuel
- 39) One metric tonne is equivalent to [c]
a) 100 kgs b) 10000 kgs c) 1000 kgs d) 500 kgs
- 40) In a balanced three phase system current flowing through the neutral is equal to [c]
a) Line circuit b) Phase current c) Zero d) Infinity

Train Lighting

- 41) When the coach is loaded with flooded batteries, the voltage setting of the 4.5 KW regulators for passenger train is [c]
a) 123 V DC b) 121 V DC c) 127 V DC d) 124 V DC
- 42) In RR box the battery fuse will be blown and flash over occurs if the DC output terminals [a]
a) should not be reversed b) should be reversed
c) should be straight d) None of these
- 43) The alternator pulley keyway and key are to be properly matched, otherwise the keyway will be worn out and pulley becomes [a]
a) Loose b) Tight c) Jammed d) None of these
- 44) What type of clamp must be provided to stop the movement of alternator suspension pin to avoid worn out of nylon bushes and other parts [b]
a) Rotating clamp b) Anti - rotating clamp
c) Fixed clamp d) None of these
- 45) The capacity of HRC fuse provided for fan, light-1 & light-2 & EFT circuits is [b]
a) 40 Amps b) 16 Amps c) 35 Amps d) 5 Amps
- 46) IR value of TL coaches measured by [c]
a) Double test lamp b) Single test lamp c) Megger d) All of these
- 47) When testing the earth leakage of coach with double test lamp, the red lamp and blue will burn equally, then the coach is [a]
a) healthy b) not healthy c) negative d) positive
- 48) When testing the earth leakage of coach with double test lamp, the red lamp will not burn and blue lamp burn brightly & the coach is having [a]
a) positive earth b) negative earth c) neutral d) none of these
- 49) When testing earth leakage of coach with 500 volt megger, the insulation resistance under bad healthy weather condition should be [b]
a) 2 mega ohms b) 1 mega ohms c) 0.5 mega ohms d) 2.5 mega ohms

- 50) The size of the cables used for BCT wires are [b]
a) 16 sq mm b) 35 sq mm c) 4 sq mm d) 30 sq mm
- 51) The size of the cables used for fan positive, L1 positive, L2 positive, EFT1 positive, EFT2 positive, EFT1 negative and EFT2 negative is [a]
a) 16 sq mm b) 35 sq mm c) 4 sq mm d) 30 sq mm
- 52) The size of the cable used for branch wiring is [c]
a) 16 sq mm b) 35 sq mm c) 4 sq mm d) 30 sq mm
- 53) The resistance between two phases of Alternator is [b]
a) 0.2 ohms b) 4.5 ohms c) 0.5 ohms d) 0.8 ohms
- 54) The pitch diameter of 4.5 KW alternator pulley is [d]
a) 300 mm \pm 0.3 mm b) 200 mm \pm 0.3 mm
c) 250 mm \pm 0.3 mm d) 150 mm \pm 0.3 mm
- 55) The pitch diameter of axle pulley is of 110 V TL system is [b]
a) 572.6 mm \pm 0.4 mm b) 500 mm \pm 0.4 mm
c) 525 mm \pm 0.4 mm d) 530 mm \pm 0.4 mm
- 56) The size of V belt used for 110 V TL alternator 4.5 KW is [a]
a) C 122 b) C 121 c) C 120 d) All of the above
- 57) The specific gravity of fully charged battery is [a]
a) 1220 b) 1175 c) 1140 d) 1180
- 58) Types of cables to be used for new coaches for wiring is [c]
a) Copper b) Aluminium c) E-beam d) None of these
- 59) The normal charge current for 120 Ah battery is [a]
a) 10 amps b) 12 amps c) 16 amps d) 24 amps
- 60) The positive plate of lead acid battery is made up of [a]
a) Lead peroxide b) spongy lead c) lead d) None

- 61) The negative plate of lead acid battery is made up of [a]
a) Lead peroxide b) spongy lead c) lead d) None
- 62) Cells converts [a]
a) Chemical energy to electrical energy b) Mechanical energy to electrical energy
c) Both a & b d) None of these
- 63) When cells are connected in series, the [a]
a) Voltage increases b) Voltages decreases
c) Capacity increases d) Capacity decreases
- 64) When cells are connected in parallel, the [c]
a) Voltage increases b) Voltages decreases
c) Capacity increases d) Capacity decreases
- 65) Sulphation occurs due to left battery under discharged condition for [c]
a) Short time b) Idle time c) Long time d) None of these
- 66) Over charging of the battery results [c]
a) High temperature, corrosion of plates, oxidation of separators, loss of water
b) Irreversible sulphation, reversal of cells and loss of capacity
c) Battery is in good condition
d) None of these
- 67) Undercharging of the battery results [a]
a) High gemperture, corrosion of plates, oxidation of separators, loss of water
b) Irreversible sulphation, reversal of cells and loss of capacity
c) None of these
- 68) Alternator is a device which converts [b]
a) Electrical energy into mechanical energy b) Mechanical energy into electrical energy
c) Kinetic energy into potential energy d) Potential energy into kinetic energy
- 69) " mm " stands for [b]
a) millimole b) millimeter c) millimile d) None of these

- 70) The size of the AL cables used for battery to under frame junction box, PVC unsheathed is [b]
a) 16 Sq.mm b) 35 sq.mm c) 4 Sq.mm d) 30 Sq.mm
- 71) The capacity of HRC fuse provided for main negative in Roof junction box is [c]
a) 40 Amps b) 16 Amps c) 35 Amps d) 5 Amps
- 72) Lux meter is used for measuring [b]
a) TDS b) Illumination c) Resistance d) None of these
- 73) TDS meter is used for measuring [a]
a) Quality of distilled water b) Specific Gravity of Electrolyte
c) Illumination d) None of these
- 74) The container of new mono block batteries is made up of [b]
a) soft rubber b) hard rubber c) PPCP d) None of these
- 75) Hydrometer is used for measuring [a]
a) Specific Gravity of cells electrolyte b) Cells Voltage
c) Earth Leakage d) None of the above
- 76) Multimeter is used for measuring [c]
a) Voltage b) Resistance c) Both a & b d) None of these
- 77) The capacity of re-wireable fuse in fuse junction box for protection of fans and lights in 110 V TL system is [c]
a) 40 SWG b) 16 SWG c) 35 SWG d) 5 SWG
- 78) The output of TL alternator is [c]
a) 40 Amps b) 16 Amps c) 37.5 Amps d) 5 Amps
- 79) What is the weight of 4.5 KW alternator? [c]
a) 200 kgs b) 220 Kgs c) 210 Kgs d) 250 Kgs
- 80) The driving end bearing of TL 4.5 KW 120 V alternator is [a]
a) NU 311 b) SKF 6309 c) S KF 6200 d) None of these

Air Condition (AC)

- 81) Rating of Static inverter used in SG AC Coaches [c]
- | | | | |
|----|--------|----|-----------|
| a. | 20 KVA | c. | 25 KVA |
| b. | 35 KVA | d. | 22.75 KVA |
- 82) Size of V belts used for 25KW Alternator [c]
- | | | | |
|----|------|----|------|
| a. | C121 | c. | C122 |
| b. | C123 | d. | C124 |
- 83) 1 ton of refrigeration is [d]
- | | | | |
|----|------------|----|--------------|
| a. | 12 BTU/Hr | c. | 1200BTU/Hr |
| b. | 120 BTU/Hr | d. | 12000 BTU/Hr |
- 84) The gap between the two halves of axle pulley should be [c]
- | | | | |
|----|--------------|----|--------------|
| a. | 0.5 – 1.0 mm | c. | 3.0 – 4.0 mm |
| b. | 2.0 – 3.0 mm | d. | 5.0 – 5.5 mm |
- 85) What are the AH capacity of cells used in AC coaches [a]
- | | | | |
|----|-----------|----|----------|
| a. | 800, 1100 | c. | 120, 800 |
| b. | 500, 120 | d. | 120, 240 |
- 86) Name of the Acid used in lead acid cells [a]
- | | | | |
|----|-------------------|----|-----------------|
| a. | Sulphuric Acid | c. | Nitric acid |
| b. | Hydrochloric Acid | d. | Phosphoric Acid |
- 87) Give the Spg & Voltage of Fully charged cells [b]
- | | | | |
|----|------------|----|------------|
| a. | 1220 & 2.2 | c. | 1200 & 2.2 |
| b. | 1220 & 2.1 | d. | 1200 & 2.1 |
- 88) IGBT are used as [a]
- | | | | |
|----|---------------------------------|----|--------------------------------|
| a. | High frequency switching device | c. | Low frequency switching device |
| b. | Illuminating device | d. | Amplifier |

- 89) Battery fuse rating in AC coaches is [b]
- a. 250 A c. 600 A
b. 400 A d. 200 A
- 90) One RMPU AC coach is provided with how many compressors. [a]
- a. 4 Nos. sealed compressor c. 4 Nos. open type compressor
b. 2 Nos. sealed compressor d. 2 Nos. open type compressor
- 100) Boost charge of VRLA cells [a]
- a. 2.3 V/Cell c. 2.25 V/Cell
b. 110 V/Cell d. 115 V/Cell
- 101) Trickle charging of VRLA cell [c]
- a. 2.3 V/Cell c. 2.25 V/Cell
b. 110 V/Cell d. 115 V/Cell
- 102) No. of MA's in 25 KW regulators [c]
- a. 1 c. 2
b. 3 d. 4
- 103) Rectifier converts [b]
- a. DC to AC c. AC to AC
b. AC to DC d. DC to DC
- 104) HP cut out trips the compressor in Under Slung AC Coaches [a]
- a. 17.6 Kg/cm² c. 0.76 Kg/cm²
b. 7.6 Kg/cm² d. 76 Kg/cm²
- 105) Heater coil rating in I AC coaches is [a]
- a. 3 KW c. 4 KW
b. 5 KW d. 7 KW
- 106) Give the half load setting of R/R of 25 KW AC [a]
- a. 97 c. 100
b. 90 d. 85

- 107) Give the diameter of Axle pulley used in AC coaches [b]
- | | | | |
|----|----------|----|----------|
| a. | 546.6 mm | c. | 500.6 mm |
| b. | 572.6 mm | d. | 600.6 mm |
- 108) Give the tension length of spring used in Tension rod of 25 KW Alternator [b]
- | | | | |
|----|--------|----|--------|
| a. | 260 mm | c. | 269 mm |
| b. | 265 mm | d. | 275 mm |
- 109) Give the DC link voltage in static inverter [b]
- | | | | |
|----|-----|----|-----|
| a. | 500 | c. | 400 |
| b. | 600 | d. | 700 |
- 110) For checking of tension of 'V' belt after fitment by [a]
- | | | | |
|----|---------------|----|---------------|
| a. | Tension gauge | c. | NO GO gauge |
| b. | GO gauge | d. | None of these |
- 111) The alternator pulley keyway and key are to be properly matched, otherwise the keyway will be worn out and pulley becomes [a]
- | | | | |
|----|-------|----|---------------|
| a. | loose | c. | jammed |
| b. | tight | d. | None of these |
- 112) What type clamp must be provided to stop the movement of alternator suspension pin to avoid worn out of nylon bushes and other parts [b]
- | | | | |
|----|---------------------|----|---------------|
| a. | rotating clamp | c. | fixed clamp |
| b. | anti rotating clamp | d. | None of these |
- 113) When testing the earth leakage of coach with double test lamp, the red lamp and blue will burn equally, then the coach is [a]
- | | | | |
|----|-------------|----|----------|
| a. | healthy | c. | negative |
| b. | not healthy | d. | positive |
- 114) When testing the earth leakage of coach with double test lamp, the red lamp will not burn and blue lamp burn brightly & the coach is having [a]
- | | | | |
|----|----------------|----|---------------|
| a. | positive earth | c. | neutral |
| b. | negative earth | d. | none of these |

- 115) Hydrometer is used for measuring [a]
- a. Specific Gravity of cells electrolyte c. Earth Leakage
b. Cells Voltage d. None of the above
- 116) Multimeter is used for measuring [c]
- b. Resistance d. None of these
- 117) BLDC fans stands for [c]
- a. AC fans c. Brushless DC fans
b. DC motor d. None of these
- 118) The 3 phase winding of alternator are connected in [c]
- a. Series c. star
b. parallel d. delta
- 119) Mark of float guide indicates minimum electrolyte is [b]
- a. Upper mark c. Medium mark
b. Lower mark d. None of these
- 120) Non-contact type thermometer is used for measuring [c]
- a. Voltage c. Temperature
b. Amps d. None of these
- 121) A terminal is said to be healthy, if the difference between Ambient temperature & temperature on thermometer is [d]
- a. 5° C c. 8° C
b. 9° C d. 10° C
- 122) TDS of DM water to be used in TL batteries shall be less than [c]
- a. 500 c. 50
b. 400 d. 200
- 123) The size of EFT cable of Copper is [c]
- a. 10 Sq.mm c. 2.5 Sq.mm
b. 16 Sq.mm d. 6 Sq.mm

- 124) The length of EFT cable is [b]
- a. 1.6 m
 - b. 1.5 m
 - c. 2 m
 - d. 1m
- 125) Lux meter is used for measuring [b]
- a. TDS
 - b. Illumination
 - c. Resistance
 - d. None of these
- 126) TDS meter is used for measuring [a]
- a. Quality of distilled water
 - b. Illumination
 - c. Specific Gravity of Electrolyte
 - d. None of these
- 127) For Amaraja maintenance free batteries, the voltage setting is [d]
- a. 126 v
 - b. 123 v
 - c. 127 v
 - d. 128.5 v
- 128) VRLA batteries work on which principle [a]
- a. Oxygen recombination
 - b. Hydrogen recombination
 - c. Both a&b
 - d. None of these
- 129) The specific gravity of pure sulphuric acid is [a]
- a. 1.840
 - b. 1.800
 - c. 2.000
 - d. 2.840

Isolated

- 130) Welding transformer is [b]
- a) Step up transformer b) Step down transformer
b) Neutral transformer d) None of the above
- 131) Oxygen to acetylene ratio in case of oxidizing flame is [b]
- a) 1.5 : 2 b) 1.5 : 1
c) 2 : 3 d) 3 : 4
- 132) Welding rectifier converts [a]
- a) AC to DC b) DC to AC
c) DC to DC d) AC to AC
- 133) Highest size of the nozzle for gas cutting purpose [d]
- a) 1/16 b) 1/32
c) 1/18 d) 1/8
- 134) Purpose of painting on wooden surface is to protect [a]
- a) Protect surface and for decoration b) To avoid corrosion
c) To have strength d) None of the above
- 135) Shelf life for paint is generally [b]
- a) Two years b) One year
c) Six Months d) Eighteen Months
- 136) Polyurethane paint is a [a]
- a) Two pack system b) One pack system
c) Three pack system d) Four pack system
- 137) Paint is diluted by using [d]
- a) Diesel b) Water
c) Petrol d) Thinner

- 147) The dis-advantage of diesel engines are [b]
- a) More oil consumption
 - b) More Maintenance
 - c) More parts
 - d) Low Maintenance
- 148) The smoke emission in four stroke engines [c]
- a) More
 - b) High
 - c) Very less
 - d) Very high
- 149) Different energy sources used for [d]
- a) Gas flame
 - b) Electric arc
 - c) Laser beam
 - d) All the three
- 150) Identify the carpenter tool [d]
- a) Sledge Hammer
 - b) Spray Gun
 - c) Tool Bar
 - d) Bench vice
- 151) In armature winding wedges are provided [c]
- a) For continuity purpose
 - b) For balance of armature
 - c) To hold the coil in the slot
 - d) None of the above
- 152) Different types of armature windings are [c]
- a) Lap winding
 - b) Wave winding
 - c) Lap & Wave winding
 - d) None of the above
- 153) In resistance welding voltage used for heating is [c]
- a) 1V
 - b) 10V
 - c) 100 V
 - d) 500V
- 154) How many boring tools are there [d]
- a) 1
 - b) 2
 - c) 3
 - d) 5
- 155) In screw jack _____ threads are used [a]
- a) Square
 - b) ACME
 - c) Butters
 - d) Metric

- 156) In an automobile, choke is applied for [c]
- a) Increasing speed
 - b) Fuel Economy
 - c) Starting in cold weather
 - d) Starting in hot weather
- 157) If grinding wheel becomes burnt it has to be [c]
- a) Changed
 - b) Cooled
 - c) Dressed
 - d) None of the above
- 158) In arc welding current used is [c]
- a) AC current of high frequency
 - b) AC current of low frequency
 - c) DC current
 - d) All the above
- 159) Fluorescent paint used for [c]
- a) Absorbs light
 - b) Refracts light
 - c) Reflects light
 - d) None of the above
- 160) Fresh polish is used for [b]
- a) Ply wood
 - b) Teak wood
 - c) Peal wood
 - d) Paddack wood
- 161) For spray painting air compressor is [a]
- a) Required
 - b) Not required
 - c) Pump is required
 - d) Required for conventional spry alone
- 162) Fire retardant paint is used for [b]
- a) Extinguish fire
 - b) Slow down the fire spreading
 - c) Resist fire
 - d) None of the above
- 163) Identify primary colour [d]
- a) Orange
 - b) Violet
 - c) Green
 - d) Red
- 164) Laser is produced by [b]
- a) Graphite
 - b) Ruby
 - c) Diamond
 - d) Emerald

- 165) In electric resistance welding two copper electrodes used are cooled by [a]
- a) Water
 - b) Air
 - c) Both A & B
 - d) None of the above
- 166) In spot welding the tip of electrodes is of [c]
- a) Stainless steel
 - b) Aluminum
 - c) Copper
 - d) Brass
- 167) Grey Cast Iron is usually welded by [a]
- a) Gas Welding
 - b) Resistance Welding
 - c) Arc Welding
 - d) All of the above
- 168) Argon gas cylinder painted with [d]
- a) Black
 - b) Maroon
 - c) Red
 - d) Blue
- 169) A good weld joint should have [d]
- a) No cracks in the weld
 - b) Good penetration
 - c) Welds of correct shape
 - d) All of the above

Question and Answers

Power Maintenance

1. What are the losses in Transformers, Explain ?

Ans. (1) Iron losses (2) Copper losses

Iron Losses : Iron losses occurs in the transformers core due to hysteresis and eddy currents.. They are almost fixed irrespective of loading of transformers.

Copper Losses: Copper losses are $I^2 R$ losses in the primary and the secondary windings of the transformer which will varies according to the load of the transformer.

2. Why a transformer requires cooling. What are the methods of cooling transformers ?

Ans. Transformers require cooling as it get heated up due to various losses taking place in the transformer.

Following are the methods of cooling of transformer.

- a. Natural cooling.
- b. Oil Natural cooling.
- c. Forced oil Natural Cooling.
- d. Forced oil and forced Air cooling.

3. What are the schedules of maintenance done on transformers ?

Ans. Following are the schedules of maintenance on transformers.

- a. Daily maintenance.
- b. Monthly maintenance.
- c. Quarterly maintenance.
- d. Half yearly maintenance.
- e. Yearly maintenance.
- f. 5 Yearly maintenance.

4. What are the different types of pumps commonly used in Railways ?

Ans. Following are the different types of pumps used inn Railways.

- a. Submersible pumps.
- b. Mono block submersible pumps.
- c. Centrifugal pumps.
- d. Jet pumps.

5. Explain the functioning of Submersible pumps ?

Ans. Submersible works in the water immersed condition. Generally they are used in Borewell. It consists of two parts, one the motor and other is pump. The motor is similar either a single phase or three phase induction mot, but a specially designed as its armature is comparatively longer than the diameter.

The pump consists of impeller and guide vane similar to a turbine as a stage. And number of stages is added to suit our requirement.

When the electric motor works the water surrounding of pump is sucked by the impellers and pumping is takes place in the delivery pipe.

6. What are the maintenance schedule of a pumping station ?

Ans. Following are the maintenance schedule of the pumping installation :

Daily inspection, of pumpset regarding noise ,temparatute rise., Greasing of motor once in a year and checking the current drawing on monthly basis.

7. What are the hydraulic data required for designing a pump capacity ?

Ans. Following are the hydraulic data required for designing the pump capacity.

- a. The depth of the Bore or well (suction height/ below ground level)
- b. The delivery height.
- c. The yield of the Borewell.
- d. The horizontal distance of the pumping.

8. How do you calculate the BHP of pump ?

Ans. The following formula is used for calculating the BHP capacity of the pump.

$$\text{Water Horse power WHP} = \frac{Q \times H}{3960}$$

3960

i.e . Q = Discharge in gallons /minute
H= Head in foots

9. What do you mean by energy conservation? why it is required and how it can be done ?

Ans. Energy conservation means saving of Electricity without fore going its utility.

Conservation is required to the present scenario of growing demand of power displacing natural resources and global warming

Conservation can be achieved by following methods.

- a. Use of star rated equipments.
- b. Replacing CFL/.T5 in place of IC lamps.
- c. By using non conventional sources of energy.
- d. Switching OFF of lights/Fans when not required.

10. What are the test and measuring instrument required in an Electrical depots ?

Ans. Following are the test and measuring instruments required in an Electrical depots.

- a. Test lamp.
- b. Line Tester.
- c. Continuity tester.
- d. Volt meter.
- e. Ammeter.
- f. Earth megger.
- g. Megger.
- h. Lux meter.

11. What are the schedule maintenance to be carried out OH mains & UG Cables? Explain half yearly schedules of OH mains ?

Ans. Following are the schedule to be maintained of OH mains and UG Cables.

- a. OH mains - Every Half yearly
- b. UG.Cables - Every Yearly.

"(a) Check all the jumper connections (b) Check the strands of the conductor (c) Check and ensure proper earth connection (d) Check proper fixation of insulators, stay wires, guard wires, e.t.c. (e) Check proper tensioning .

12. What is meant by Power factor and what is a transformer ?

Ans. Power factor means ratio of true power to apparent power.

Transformer is a static device which transforms power from one circuit to the other Circuit without changing the frequency.

13. What is stabilizer ?

Ans. Stabilizer is a device which supplies constant voltage irrespective of variation in the incoming power supply.

14. How can the state of charge of battery is best indicated and What is the purpose of Overload Protection in a motor circuit ?

Ans. The state of charge of battery is best indicated by specific gravity of electrolyte and voltage of the battery.

The Overload Protection is used in a motor circuit to protect from over currents.

15. Explain the sequence of operation of fire extinguisher.

- Ans.
- a) Pull the pin at the top of the extinguisher.
 - b) Aim the nozzle towards the base of the fire.
 - c) Stand approximately 8 feet away from the fire and squeeze the handle to discharge the extinguisher.
 - d) Sweep the nozzle back and forth at the base of the fire.

16. Classify the low tension and high-tension lines with respect to voltages ?

- Ans.
- a) Low Voltage Lines = Less than 250V
 - b) Medium Voltage Lines = 250 V to 650V
 - c) High Voltage Lines = 650V to 33 KV
 - d) Extra High Voltage Lines = Above 33 KV

17. What is the function of CT & P.T and where they are used?

Ans. CT means Current transformer and is used for measuring of current. PT means Potential transformer and is used to measure voltage.

18. How many type of Motors are there ?

Ans. According the current there are two types of motors

- a) AC motors i) single-phase AC motors ii) 3-phase AC motors.
- b) DC motors i) shunt motors, ii) Series motors, iii) Compound motors.

19. How do you change the direction of rotation of a D.C. motor and What is the cause of sparking at the brushes of a DC Motor ?

Ans. The direction of rotation of DC motor can be changed either by changing the field winding connections or by changing the armature winding connection.

Sparking at the brushes may be occur due to poor quality of carbon brushes, poor armature, loose connection of carbon brush holder and loose spring tension.

20. How do you change the direction of rotation of 1 ϕ AC motor & 3 ϕ AC motor ?

Ans. The direction of rotation of single-phase AC motor is changed by changing the capacitor connections from starting winding to running winding and vice versa. The direction of rotation of three-phase AC motor is changed by changing the phase sequence of three-phase supply.

21. What is Ohm's Law ?

Ans. The electric current is directly proportional to electro motive force and inversely proportional to the resistance at constant temperature.

22. What is electricity ?

Ans. It is a form of energy, which is invisible but can be felt by its effect.

23. What is DC ?

Ans. It is a unidirectional current which changes its magnitude but not the directions.

24. What is AC ?

Ans. It is the current which changes its magnitude and direction periodically.

25. What is fuse ?

Ans. Fuse is used to protect an electric circuit when the rated current exceeds in the circuit, the fuse wire melts and opens the circuit.

26. What is an alternator ?

Ans. Alternator is a machine which converts mechanical energy into electrical energy.

27. What is a motor ?

Ans. Motor is a machine which converts electrical energy into mechanical energy.

28. Why starter is used in fluorescent tube ?

Ans. Starter is used in fluorescent tube to give boosted voltage duly breaking the supply at the time of ignition of the tube light.

29. Why the choke is used with tube light ?

Ans. Choke is used as inductance which will give boost voltage at the time of starting.

30. What do you mean by domestic air conditioner ?

Ans. It is a closed self contained cooling unit in a cabinet.

31. What is a battery ?

Ans. Battery is a device which converts chemical energy into electrical energy.

32. What is the advantage of HRC fuses when compared with rewirable fuses ?

Ans. HRC fuses have high rupturing capacity, high speed of operation and no aging effect.

33. What is the purpose of Overload Protection in a motor circuit ?

Ans. The Overload Protection is used in a motor circuit to protect it from sustained over currents.

34. How can the state of charge of battery is best indicated ?

Ans. The state of charge of battery is best indicated by specific gravity of electrolyte.

35. What is an earth ?

Ans. Any wire of supply line touches the earth is called an earth.

36. What is fuse ?

Ans. Fuse is used to protect an electric circuit when the rated current exceeds in the circuit the fuse wire melts and opens the circuit.

37. What do you mean by coil ?

Ans. Having one or more turns connected in series is called coil.

38. During maintenance what items are to be checked on U.G cables ?

Ans.

1. Check the insulation values of cables once in a year.
2. Check under ground cables near the poles / structure for any damages and also the condition of vertical protection pipe.
3. Check for proper earthing of cable armored and cable protection pipe.

39. Why is Earthing of electrical apparatus necessary ?

Ans. It is well known that the metallic frames of all electrical equipments should be solidly connected to earth to drain away the faulty current (Earth leakage) quickly so that fuse will be blown or Circuit breaker is tripped and to keep the frame at earth potential to achieve safety to the equipment as well as the staff.

40. What are the methods of improving earth resistance?

Ans. The earth resistance can be considerably reduced by digging around the earth electrode to a depth of 1.5 or 1 meters, cleaning the surface of the earth plate or pipe of rust, filling with charcoal soaked in salt solution.

Train Lighting

41. What is Alternator & explain its usage in coaches ?

Ans. Alternator is a device which converts mechanical energy into electrical energy with self excitation or separate excitation. Alternator is used in coaches to generate supply to charge batteries & supply to the coach load while running.

42. What are the major parts of 4.5 KW Alternator ?

Ans. The TL alternator of 4.5 KW consists of (i) Stator (ii) Rotor (iii) Field winding (iv) AC winding

43. How do you find earth leakage of TL coach ?

Ans. Earth leakage can be detected by double test lamp method or with 500 volts megger.

44. What are the safety items to be checked for TL coaches under frame ?

Ans. The safety items to be checked for TL coaches under frame are (a) alternator suspension pin with cotter pin, Transmounting bushes level, Safety chains with nut & bolts. (b) Terminal box, lugs, cables insulation & cleat (c) Junction box and running cables with hose pipes.

45. What is the permissible voltage drop in 110 volts in TL systems ?

Ans. Total voltage drop between the battery and any of the farthest light/fan point shall not exceed 3 volts. If battery voltage 108 volts then the voltage at farthest point should not be less than 105 V.

46. What are the causes of fires in coaches ?

Ans. Due to short circuits, loose connections, over loading, use of under size cables, by passing of safety devices, use of Over rating HRC fuses & use of overaged cables.

47. How much current does the 120 Ah battery take during normal charging ?

Ans. The 120 Ah battery take, 10 Amps during normal charging.

48. What is the capacity of inverter used in Pantry cars ?

Ans. Inverters of 2.5 KVA capacity are used in pantry cars.

49. What happens when cells are connected in series ?

Ans. Voltage increases if cells are connected in series .

50. What happens when cells are connected in parallel ?

Ans. Capacity increases if cells are connected in parallel .

51. What is the field supply of alternator ?

Ans. The field supply of the alternator is D.C.

52. What are the main parts of lead acid cell ?

Ans. The main parts of lead acid cell are +ve & -ve plates, electrolyte, container and container .

53. What type of bearings are used in 110V DC fans ?

Ans. The bearing used in 110V DC fan is SKF6200.

54. What are the reasons for no generation ?

Ans. The reasons for no generation are Field may be open, dropping of 'V' belts, defective of RSW1 in Power panel, fuses may be blown in regulator, etc.

55. What is the Specific gravity of pure sulphuric acid ?

Ans. The specific gravity of pure sulphuric acid is 1.840.

56. Why control of voltage is required in TL/AC coach alternator ?

Ans. The prime mover of TL/AC alternator is train axle whose speed is not constant. Due to variation of train speed the output voltage of alternator is also varies. A constant voltage is required to operate TL/AC loads. Hence voltage control is necessary for TL/AC coach alternators.

57. On what principle TL/AC alternators are working ?

Ans. TL/AC alternators are working on Faraday's laws of electro magnetic.

58. How field winding helps to control output voltage/current ?

Ans. By varying the field voltage and current, field flux is varied, which in turn controls output voltage/current.

59. Explain Schedule attention on Lead Acid Batteries in FNE schedule ?

Ans. Cleaning of ICC, topping up of distilled water, applying of petroleum jelly on terminals ports. Checking of SPG. Providing charging. Checking of ON load and OFF load voltage of individual cells and group.

60. Explain the procedure for through feeding in TL coaches in case of adjacent coach is dark/dim ?

Ans. The detailed procedure of emergency feed extension is given as under.

1.0 Action to be taken in healthy coach

1.1 The availability of power supply in the emergency feed terminal should be ensured.

1.2 Only one dark coach should be extended feed supply from one healthy coach.

1.3 Before connecting, the polarity of healthy coach as well as dark coach shall be checked.

1.4 L-II circuit of the healthy coach shall be switched off before connecting supply to dark coach.

1.5 The rotary switch of (socket paralleling main) SPM-I and II shall be kept in ON position.

2.0 Action to be taken in defective coach and feed extension

- 2.1 L-II and fan circuit of the dark coach shall be switched off before connecting supply from healthy coach.
- 2.2 The rotary switch of (socket paralleling main) SPM-I and II shall be kept in ON position
- 2.3 The L-I circuit is having essential/emergency lighting circuit. This includes all lavatory lights 50% of compartment lights, and night lights in all types of IInd class coaches.
- 2.4 Remove(+ve) fuse from battery box and)-ve) main fuse from junction box to disconnect the power supply to/from battery.
- 2.5 The earth fault shall be checked up with the help of testing lamp. If earth fault is there then feed extension should not be done.
- 2.6 The feeding shall be given to L-I circuit only of the dark coach from healthy coach.
- 2.7 The defective coach shall be attended and cable should be removed at the first available opportunity by TL staff.
- 2.8 The size of the cables for the feed extension shall be of 16 sq.mm PVC Aluminium /2.5 sq.mm elastomeric /2.5 sq.mm e-beam copper cables.
- 2.9 The length of the wire for feed extension shall be 2x1.5 meter (for both terminals). The length of the cable shall not be more than 1.5 meter.
- 2.10 Both ends of the cable shall be provided with suitable size of lug.
- 2.11 The cable shall be secured tightly by the screws or bolts, nuts and plain washer. The proper tightness of the connections should be ensured.

61. What is the procedure for preparing electrolyte ?

Ans.

- (i) Take 3:1 ratio of distilled water and sulphuric acid of 1.870 specific gravity.
- (ii) Add slowly acid into distilled water(not vice-versa)
- (iii) Mix properly

62. How to detect reversing of cell ?

Ans.

- (i) Switch on total load of TL coach.
- (ii) Record individual cell voltage of the bank.
- (iii) If reverse voltage found, remove cell & provide cell with same make and lug date.

63. What are the advantage of VRLA batteries ?

Ans.

- (i) VRLA batteries are supplied to customer in ready to use condition.
- (ii) Topping up of water is not required.
- (iii) They are compact and can be used in any orientation.
- (iv) They do not emit corrosive fumes and gases.

64. What is BCT and why they are provided ?

Ans.

BCT means - Battery Charging Terminal and these are provided at both sides of the coach for external charging of the batteries.

65. What are the causes of Earth in coaches & procedure for removing earth from the coach ?

Ans. **Causes of Earth in the coach.**

- (i) Failure of insulation resistance of cables.
- (ii) Leakage of electrolyte from batteries.
- (iii) Due to carbon accumulation in DC carriage fans.
- (iv) Loose connections at switches & cables touching metallic parts.
- (v) Grounding of fans winding.

Procedure for removing earth from the coach.

- (i) Cleaning of DC fan regularly.
- (ii) Cleaning of cells regularly.
- (iii) Do not allow loose connections at switches.

66. In L-1 circuit of TL coaches what are the areas of coach lighting covered ?

Ans. L - 1 circuit included lavatory lighting and 50 % of compartment lights, door way lights, Night light circuit.

67. What is the colour coding in TL coach cables ?

Ans. Main Positive cable - Red, Light circuit +ve cable - Yellow, Fan -ve cable - Black & All other negative cables, except fan negative cable - Blue.

68. What are the checks during TRIP INSPECTION for Cells ?

Ans.

- (i) Check for bye passing of failed cells. If bye-passed cells are found replace these failed cells immediately with the healthy ones.
- (ii) Dust accumulation – if observed, clean with dry cotton cloth.
- (iii) Cell cover / container cracked or burst – if noted replace the cell with a healthy cell immediately.
- (iv) In case of battery terminal / cable over heating sign, check for loose connection at the cell terminal post / cable end. If required replace the cable immediately.
- (v) Protective lid on safety valve – if missing provide new one immediately.
- (vi) Check for arrival time of the Train. If train has arrived late due to heavy detention en-route due to some reasons, charge the coach battery bank as per Annexure – 1 to bring up the State of Charge of the Battery Bank before putting the AC coaches again in Service
- (vii) Do not boost charge the cells for more than 12 hours.

69. What are the checks during TRIP INSPECTION for Alternator, Axle Pulley & V-belts ?

Ans.

Alternator

Check the warmness of the alternator on arrival, if found cold check the following.

- (i) Check the field fuse of the regulator
- (ii) Check the continuity of field winding & phase winding with the help of multimeter or test lamp.
- (iii) Ensure windings are not open circuited.
- (iv) Check the connection tightness of alternator & regulator terminals.
- (v) Remove the V-belt and battery connections & check generation with portable motor drive.
- (vi) In case of no generation inform rake incharge.
- (vii) Check all other underframe safety items.

Axle Pulley

- (i) Check white marks on axle pulley & ensure pulley has not slipped.
- (ii) Tap the pulley with the hammer & judge the tightness or crack by sound.
- (iii) Check the lock nuts & split pins.
- (iv) Check the gap between two halves of the axle pulley, it should be 3mm.
- (v) Check the rubber pad availability.

V-Belts

- (i) Check the condition of V-belts for fraying of edges.
- (ii) Check the V-belts for overturn & rectify it.
- (iii) Check the belt tension and adjust if required.

Regulator

- (i) Clean regulator externally, open regulator terminal cover & check for signs of over heating.
- (ii) Tighten loose connections

70. If water consumption in a particular cell is more, what are the checks to be done ?

Ans. Check the following. (i) Over heating of cell (ii) Any crack on lid or container (iii) Leakage from vent plug or float guide (iv) Crack in sealing or pinholes (v) If water consumption is more in all the cells, then charging voltage should be checked (vi) Frequency of topping up should be recorded (vii) Then matter should be reported to rake in charges.

71. What is the voltage for Weeding out of defective cell ?

Ans. If cell voltage is found less than 1.7 Volts it has to be removed from the cell bank.

72. What is significance of Green and Red mark of the float guide of Lead Acid Cells ?

Ans. The float stem will have markings to indicate the lowest in red and highest in green of permissible electrolyte levels. It should be ensured that the electrolyte level is maintained in service by adding pure distilled / dematerialized water.

73. What are the equipments available in PELE box ?

Ans. The equipments available in PELE box are.

- (i) TRIPOD STAND
- (ii) HOLDER
- (iii) FLEXIBLE WIRE 25 METERS
- (iv) CROCODILE CLIPS
- (v) BULBS
- (vi) HAND LAMP
- (vii) LOG BOOK
- (viii) LAMP FITTINGS

74. What are the reasons of V-Belts dropping ?

Ans. Locking of barrel bush, locking of alternator safety chains, misalignments of axle pulleys, Alternator bearing jam and due to cattle run over.

75. What is the gap between the Mounting Bracket to adjustment nut in Tension device & how to adjust?

Ans. The gap between the Mounting Bracket to adjustment nut in Tension device is 55 mm & it can be adjusted by opening check nut and adjusting barrel bush.

76. Write about electronic ballast for FL used in TL coaches ?

Ans. It is an assembly comprising of semiconductors, toroidal transformer and associated electronic and electrical components used for DC to AAC inversion and shall include for stabilized power output, surge suppression, radio frequency suppression and protective circuits adopted for satisfactory performance and reliability of the inverter unit.

77. How do you test working of Emergency Light Unit ?

Ans. Press the push button and check the Emergency light unit status.

(i) All four Emergency light unit should glow with Red LED indication "ON" in each unit.

(ii) If any of the unit is not working then check indications status of LED's on the unit as Under.

(a) If green LED is "OFF" it means battery connection inside emergency light unit is not intact. Remove the unit from ceiling and check it on test bench.

(b) If Red LED is "flashing " it means battery needs to be replaced. Remove unit from ceiling and check battery and if required replace the defective battery.

(c) If Green LED is "flashing" it means battery is under cyclic discharge mode and is being discharged internally.

78. What are the types of schedule maintenance laid down for TL coaches ?

Ans. Trip, Fortnightly, Monthly, Quarterly, IOH & POH.

79. What are the parameters checked to give fire fitness of a coach ?

Ans. The following parameters should check to prevent fire in coaches.

(i) Check the + ve Leakage

(ii) Check the - ve Leakage

(iii) Check the heating symptoms at junction box

(iv) Tightening of loose connections at terminal boards

(v) Checking of proper rating of HRC fuses

(vi) Ensuring FNE of cells

(vii) Checking the Condition of OVP in RRUs

80. What are the parameters to be checked for avoiding V-Belts dropping for TL coaches ?

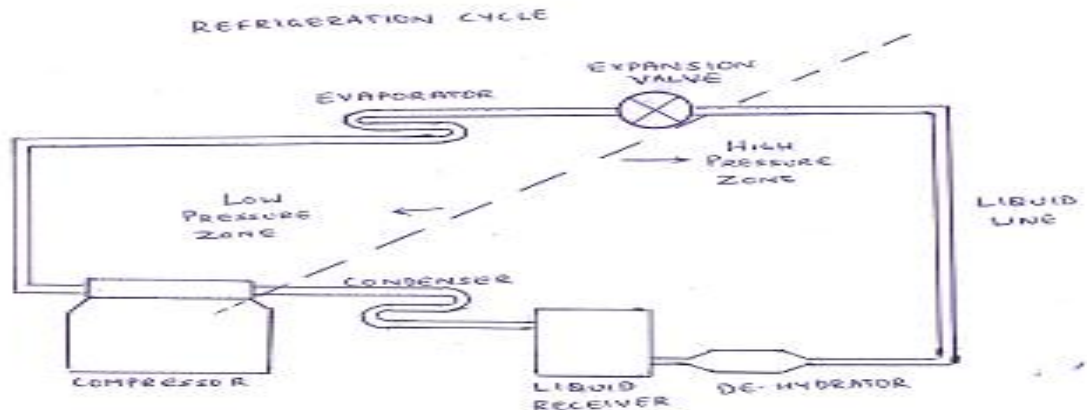
- Ans.
- (i) Ensure gap between two halves of axle pulley to 3.0 ± 0.5 mm and tightening torque should be up to 30 kg - mtr (maximum)
 - (ii) Replace pulleys if grooves are worn out by 0.8 mm depression on sides or bottom of groove is uniformly shining.
 - (iii) Distance between Axle Pulley face to Wheel Hub to be maintained (230 ± 3 mm for 25KW, 145 ± 5 mm for 4.5KW)
 - (iv) Checking of Gap between Tension device supporting plate and Tension Device sleeve (50mm for AC and 35mm for Non AC Coaches)
 - (v) Tension gear spring length after tensioning (310 ± 5 mm for Non AC coaches)
 - (vi) Checking of Alignment between Alternator Pulley and Axle Pulley (Tolerance 5 mm)
 - (vii) Check Belt Tension Gear Suspension bracket Hole dia (76mm)
 - (viii) Check Belt Tension gear suspension bracket length (420mm for AC and 400mm for Non AC Coaches)
 - (ix) 100% of V Belts replaced with same grade (set).

Air Condition (AC)

81. Explain the sequence of operation of fire extinguisher.

- Ans:
- Pull the pin at the top of the extinguisher.
 - Aim the nozzle towards the base of the fire.
 - Stand approximately 8 feet away from the fire and squeeze the handle to discharge the extinguisher.
 - Sweep the nozzle back and forth at the base of the fire.

82. Draw Refrigeration cycle and indicate the plants ?



lamp, pinching tool, brazing rod, brazing flux, sweating bits, etc.

83. List out the parts of Under Slung AC coach ?

- Ans: The parts of under slung AC coaches are Alternators, RR unit, Batteries, Pre-cooling transformer cum rectifier unit, AC control panels, Compressor, Compressor motor, Condenser fan motors, Condenser coil, Evaporator cooling coil, Blower motor, spot strainer, Thermostatic expansion valve, Suction & Discharge pipe lines, Liquid receiver, Dehydrator, Heater coils, Thermostats, Vane relays, LP, HP, & OP cutouts & gauges, filters, lights & Fans etc.

84. List out the parts of RMPU AC coach ?

- Ans: The parts of RMPU AC coach are Alternators, RR unit, Batteries, Pre-Cooling transformer cum rectifier unit, WRAs, Power panel, Invertors, AC control panels, sealed type compressors, condenser fan motors, condenser coils, blower motor, evaporator coils, capillary tube, Vane relays, thermostats, LP, & HP, cutouts, filters, heaters, lights & Fans etc.

85. List out the different types and makes of cells used in AC coaches with capacity ?

- Ans: The different type of cells used in AC coaches are Lead acid and VRLA type
Makes of Lead Acid 800 Ah cells: Bharath, Kirloskar, southern, starplus, Amco, Exide, jumbo, Cel-tech
Make of VRLA 1100 Ah cells : Amara raja, Kirloskar, Exide, & HBL..

86. How many cells are available in an AC coach and list out the types of WRAs?

Ans: There are 56 no. of Lead Acid cells available in an AC coach. There are two type sof WRAs. They are a) Mono block type b) Compressor type.

87. What rating of the fuse used for phase supply & field supply in Regulator of AC Coaches ?

Ans: 160 Amps fuse for phase supply and 6 Amps fuse for field supply.

88. Describe in detail the items to be checked during trip schedule maintenance of AC Coach ?

Ans: The following items to be checked during trip schedule maintenance of AC coach: Alternator phase and field terminals, alternator safety chains, Suspension pin with anti-rotation plate, Alternator pulleys, Axle pulley with bolts battery box, On load and OFF load voltage, condition of the AC plants & power panels with fuses, nuts and bolts and split pins of all under gear electrical suspension equipments, checking of positive & negative earth. Alternator phase and field terminals, alternator safety chains, suspension pin with anti-rotation plate, alternator pulleys, axle pulley with bolts battery box, on load and OFF load voltage, condition of the AC plants & power panels with fuses, nuts and bolts and split pins of all under gear electrical suspension equipments.

89. What attention to be paid to Alternator during trip schedule maintenance ?

Ans: Condition of Alternator phase and field terminals along with their lugs, alternator safety chains, alternator terminal cover, condition of alternator cable cleats and clamps, Suspension pin with anti- rotation plate, Alternator pulleys, condition of the tensioning devices and and condition of the 'V' belts.

90. What action to be taken if compressor does not start ?

Ans: For roof mounted AC package units compressor (sealed compressor) Check the 3 – phase supply at terminal, check for bearing jam, check for compressor winding continuity. For Under slung AC coaches (open type compressor) Check DC supply at terminals & fuses, check carbon brushes and holders, tyre coupler etc,.

91. What are the reasons for High discharge pressure ?

Ans: The reason for high discharge pressure is a) Not working of condenser fan motors, b) dusty condenser coil, c) high ambient temperature motor, d) excess gas in the system.

92. What are the reasons for low suction pressure ?

Ans: a) Blocking of air filters, b) not working of blower motor, c) Less gas in the system

93. What are the points to be checked before starting AC Plant and after starting AC Plant ?

Ans: Before starting AC plants : Check the OFF load voltage, availability of supply in control panel, condition of Loures, condition of fuses and condition of rotary switches and condition of condenser fan blades.

After starting AC plants: Chec the direction of the airflow, working of vane relay, direction of rotation of condenser fan motors, HP, LP, OP Pressures, on load voltage, compressor loads, etc,.

94. What are the reasons for less cooling and their remedies ?

Ans: Reasons for less cooling are Louvers may be in closed condition, not working of blower motor, direction of rotation blower motor, chocking of air filters, ducting canvas torn condition.

95. Describe the procedure for replacement of Manerope Compressor ?

Ans: Procedure for replacement of Manerope Compressor: Remove three phase connections, disconnect the suction and discharge pipe lines, remove defective compressor, provide new compressor, connect suction and discharge pipe lines and connect the supply, conducting pressure test, vacuuming the system, charging the gas.

96. What is Cut in & Cut of pressure of WRA pressure Cut out ? If alternator is not generating Voltage, what is the reason ?

Ans: Cut in pressure of WRA is 0.5 kg/cm^2 & Cut off pressure is 0.7 kg/cm^2 Field may be open, dropping of 'V' belts, defective of RSW1 in Power panel, fuses may be blown in regulator, etc.,

97. What are the Safety Checks in under gear and batteries ?

Ans: Check the Alternator safety chains, Suspension pin with anti- rotation plate, suspension pin with nylon bushes, Alternator pulleys, Axle pulley with bolts condition of battery box channels, nuts & bolts and split pins of all under gear electrical suspension equipments.

98. How to adjust V-Belt & reasons for dropping ?

Ans: According to guide plate (alternator capacity) adjust the tensioning device with suitable spanners. locking of barrel bush, locking of alternator safety chains, misalignments of axle pulleys, Alternator bearing jam and due to cattle run over.

99. What are the safety checks in AC Coaches before dispatch ?

Ans: Battery fuses, battery box covers, 'V' belts, On load and OFF load Voltage, condition of lights and fans.

100. How do you adjust Tensioning Device ?

Ans: According to guide plate (alternator capacity) adjust the tensioning device with suitable spanners.

101. What are the items to check the condition of Pulleys of Axle & Alternator?

Ans: Axle pulleys nuts and bolts with split pins, condition of grooves, and gap between two halves of the axle pulleys. Alternator pulley castle nut with split pin.

102. What is significance of Green and Red mark of the float guide of Lead Acid Cells ?

Ans: The float stem will have markings to indicate the lowest in red and highest in green of permissible electrolyte levels. It should be ensured that the electrolyte level is maintained in service by adding pure distilled / dematerialized water.

103. How do you test working of Emergency Light Unit ?

Ans: Press the push button and check the Emergency light unit status.

(i) All four Emergency light unit should glow with Red LED indication "ON" in each unit.

(ii) If any of the unit is not working then check indications status of LED's on the unit as under :-

(a) If green LED is "OFF" it means battery connection inside emergency light unit is not intact. Remove the unit from ceiling and check it on test bench.

(b) If Red LED is "flashing " it means battery needs to be replaced .Remove unit from ceiling and check battery and if required replace the defective battery.

(c) If Green LED is "flashing" it means battery is under cyclic discharge mode and is being discharged internally.

104. What are the parameters checked to avoid fire in coaches.

Ans: The following parameters should check to prevent fire in coaches.

(i) Check the + ve Leakage

(ii) Check the – ve Leakage

(iii) Check the heating symptoms at junction box

(iv) Tightening of loose connections at terminal boards

(v) Checking of proper rating of HRC fuses

(vi) Ensuring FNE of cells

(vii) Checking the Condition of OVP in RRUs

105. What are the causes of fires in coaches ?

Ans: Due to short circuits, loose connections, over loading, use of under size cables, by passing of safety devices, use of Over rating HRC fuses & use of overaged cables.

106. What are the main parts of lead acid cell ?

Ans: The main parts of lead acid cell are +ve & -ve plates, electrolyte, container and container lid.

107. What are the cause of earth in coaches & procedure for removing earth from the coach ?

Ans: Causes of earth in coach :

1. Failure of insulation resistance of cables.

2. Leakage of elctrolyte from batteries.

3. Due to carbon accumlation in DC carriage fans.

4. Loose connections at switches & cables touching metallic parts.

5. Grounding of fans winding.

Procedure for removing earth from the coach:

1. Cleaning of DC fan regularly.

2. Cleaning of cells regularly.

3. Do not allow loose connections at switches.

ISOLATED

108. What are the carpentry tools ?

Ans. The carpentry tools are as follows.

1. Marking measuring tools
2. Cutting tools
3. Planning tools
4. Boring tools
5. Striking tools
6. Holding & miscellaneous tools

109. What is meant by boring tools and how many boring tools are there ?

Ans. Boring tools are necessary to make round holes in wood. Boring tools are bradawl, gimlet, brace, bit and drill.

110. What are the holding tools ?

Ans. Holding tools are as follows.

1. Bench vice
2. Bench shop
3. Bench hold fast
4. Sash cramp
5. G. cramp
6. Hand screw

111. What are the uses of Try square ?

- Ans.
1. To check faltness of the surface
 2. To check squareness of the edge
 3. To check the inside squareness

112. Name the different types of saws ?

Ans. 1. Straight cutting saw

1. Rip saw
 2. Cross cut saw
 3. Hand saw
 4. Panel saw
 5. Tenon saw
 6. Dow tail saw
- II. Curve cutting saw
1. Bow saw
 2. Compass saw
 3. Coping saw
 4. Nest saw
 5. Fret saw
 6. Key hole saw

113. What is a plane ? Name three types ?

Ans: A plane is a hand tool used for smoothening or shaping pieces of wood.

1. Jack plane
2. Finishing plane
3. Smoothening plane
4. Rough plane

114. What is the use of plumb bob?

Ans: The main use of plumb bob is to transfer points down vertically in marking.

115. Name the different types of joints in carpentry ?

- Ans:
1. Lengthening joints
 2. Widening joints
 3. Framing joints
 4. Box joints
 5. Circular joints

116. Where are the following joints used - Widening, framing and circular joints ?

Ans: Widening joints - Joining wood pieces along their edges

Framing joints - They are used in frame work

Circular joints - Used for connecting wood pieces to form a hollow cylindrical structure

117. Name the different types of nails used in carpentry ?

- Ans:
1. Diamond head nail
 2. Jolt head or bullet head
 3. Flat head round
 4. Roofing nail
 5. Panel pin
 6. Veneer pin
 7. Finishing or cut nail
 8. Upholstery nail

118. What is SWG and what is its use ?

Ans. SWG means Standard Wire Gauge. It is used to measure the thickness of sheet.

119. State the different types of Indian timbers? Give uses of any two ?

- Ans.
- | | | |
|---------|---|-------------------------------|
| Teak | : | Furniture and cabinet making |
| Deoder | : | Construction purpose, packing |
| Chil | | |
| Kail | | |
| Shisham | | |
| Sal | | |
| Babul | | |
| Bamboo | | |
| Mango | | |

120. State the types of wood preservative with Example ?

- Ans.
1. Oil preservatives
EX: Coal, Tar
 2. Water solution Preservatives
EX: Zinc Chloride, white arsenic
 3. Mechanical Preservatives
EX: Sheathing, chaining.

121. What is welding ?

Ans. Welding is the process of joining similar metals.

122. What are the major factors of weld ability ?

- Ans: Weld ability depends on five major factors. They are as follows:
1. Melting point
 2. Thermal conductivity
 3. Thermal expansion
 4. Surface condition
 5. Change in micro structure

123. How many types are there in welding ?

- Ans. Welding may be classified into two categories. They are
1. Plastic welding or pressure welding
 2. Fusion welding or non pressure welding

124. What are the welding equipments ?

- Ans. The welding equipments are as follows :
1. Welding torch
 2. Pressure regulator
 3. Goggles
 4. Gloves
 5. Spark lighter
 6. Welding rods

125. What are the advantages of TIG welding?

- Ans.
1. It produces high quality welds in non ferrous metals.
 2. Practically no weld cleaning is necessary.
 3. The arc and weld pool are clearly visible to the welder.

126. What is the non- destructive test for checking welding joint and the material coated on the welding electrodes and explain its importance ?

Ans. The material coating on the electrode is called flux. Fluxes are used in welding in order to protect the molten metal and the surfaces to be joined from oxidation.

127. Name the three non-ferrous material ?

Ans. Copper, Brass, Aluminium

128. Name the two ferrous material ?

Ans. Mild steel and Cast iron.

129. While carrying the arc welding where you connect the earth and why post cleaning is necessary at brazed joints ?

Ans. Earth connection is directly given to the job and post cleaning is necessary at brazed joints in order to avoid corrosion.

130. How many types of regulators are there in gas welding and name the advantages of any one of them ?

Ans. There are two types of regulators :

1. Single stage
2. Double stage

The advantage of two stage regulator is that the pressure remains constant.

131. What are the different components in paint ?

Ans. Physically, paint is a mixture of four important elements :

Pigments, Additives, Binders and solvents

1. Pigments render color and opacity to the paint.
2. Additives endow the paint with special properties such as resistance to fungus, rust etc.
3. Binders hold the paint together and also bind it to the surface being painted, thus promoting durability.
4. Solvents give a paint its flowing property, enabling brushing/rolling on a surface.

132. What is the purpose of painting ?

Ans. Different paints have specific properties that prevent , or at least delay the rusting and corrosion by forming a protective layer around the substrate. Different colour schemes provide aesthetic look to materials.

133. What are the different types of painting system followed in Indian Railways ?

Ans: Alkyd-Alkyd-Alkyd-Alkyd system
Epoxy - Epoxy-Alkyd system
Epoxy-Epoxy-Polyurethane system
Epoxy-Polyester-Polyurethane system

134. What are the different infrastructure and facilities required for surface preparation?

Ans: 1. Shot blasting equipments
2. Blasting material
3.Masking facilities
4. Safety equipments
5. Compressed air, brushes, etc
6. Inspection comparator
7. Inspection gauges

135. What are the painting schedules followed on coaches during POH at workshop ?

Ans. There are two types of painting schedules followed on coaches during POH "A" & 'C' schedule:
If the condition of the paint so warrants or at every 5th POH of a coach, the paint should be completely removed to the bare metal and the coach repainted as per paint schedule 'A'.
If the general condition of the paint is good, paint schedule 'C' should be followed.
"A" schedule is carried out for a period of 9 days.
"C" schedule is done for 5 days.

136. What are the defects developed on painting surfaces ?

Ans. Defects like sagging, wrinkling, chipping and blistering is a big problem, given the extremities of weather conditions.

137. What are the different types of paints ?

Ans.

1. Enamel Paint : Enamel paints are modern paints . It forms a hard paint film after drying, which are scratch resistant and shining.
2. Under coat paint: Under coats are similar to under garments. These are used below the finishing paint coats. Under coats are dull in appearance and have matt finish.
3. Putty or Knifing Stopper: Putty is used to fill up surface irregularly such as dents, riveted areas etc. after application of putty an uniform surface can be obtained.

138. What is the best type of wood glue ?

Ans. Standard yellow wood glue is the best type of wood glue.

139. What is window sash ?

Ans. In a sash window, the window panels open by sliding up and down in vertical grooves.

140. Why plants are considered as a good raw material ?

Ans. Plants are good raw material because they decompose and return to the soil easily.

141. What are the advantages of wooden doors ?

Ans. The advantages of wooden door is the ability to stain it or paint it and making it look very decorative.

142. What is PVC made from ?

Ans. It is a polymer which is made from polyvinyl chloride (PVC).

143. What are the properties of cutting tools ?

Ans. Cutting tool should be more harder than the material to be cut otherwise it can break during the process.

144. What is meant by two pack system in painting and what is the shelf life of a paint ?

Ans. Polyurethane paint is called two pack system. The Shelf life of a paint is one year.

145. Which paint reflects more light and how you reduce the viscosity of paints ?

Ans. Fluorescent paint reflects more light. By adding thinner the viscosity of the paint is reduced.

146. In arc welding which rays will emit and how you protect your eyes from damaging ?

Ans. Infra red and ultra violet rays are produced in arc welding. Eyes can be protected by using arcing screen/shield while carrying the welding.

147. Which gas is used in Tungsten gas welding ?

Ans. Inert gas is used while carrying the Tungsten gas welding.

True or False

Power Maintenance

- 1) For fires of electrical origin throwing water is most safe and efficient way extinguishing the fires **FALSE**
- 2) Silica gel used in breathers absorbs moisture **TRUE**
- 3) When the lead of test lamp is put in " Earth" & "neutral" points of a 3 pin socket the lamp glows **FALSE**
- 4) We can improve the earth resistance by packing common salt charcoal & water **TRUE**
- 5) MCB is used in circuits for overload protection. **TRUE**
- 6) Oil is used as a insulator in the transformers. **TRUE**
- 7) Wood is a good conductor of electricity. **FALSE**
- 8) Faradays is the unit of current. **FALSE**
- 9) Water is a good conductor of electricity. **TRUE**
- 10) VRLA batteries consume more water. **FALSE**
- 11) Ampere hour indicates power of alternator. **FALSE**
- 12) Standard wire gauge is used to measure length of wires. **FALSE**

Train Lighting

- 13) MKS stands for Meters, kgs and pounds. **FALSE**
- 14) MCB stands for Main Circuit Board. **FALSE**
- 15) SWG stands for standard wire gauge. **TRUE**
- 16) While working in electricity rubber hand gloves is used to have more grips. **FALSE**
- 17) The field supply of alternator is alternating current. **FALSE**
- 18) When the cells are connected in series the voltage increases. **TRUE**
- 19) The positive plate of lead acid battery is lead peroxide. **TRUE**
- 20) Copper conductor carries less current when compared to aluminum conductor. **FALSE**
- 21) MCB stands for – Main circuit board **FALSE**
- 22) PCD stands for – Pitch circle diameter **TRUE**

- 23) LMS stands for – Load master switch **TRUE**
- 24) SWG stands for – Steel wire gauge **FALSE**
- 25) ET stands for – Excitation transformer **TRUE**
- 26) AL stands for – Ampere load **FALSE**
- 27) FCS stands for – First class with coupe and second class **TRUE**
- 28) WGS stands for – Second class luggage van and break van **FALSE**
- 29) SLR stands for – Vestibule second class **FALSE**
- 30) WCB stands for – Pantry car **TRUE**
- 31) BCT stands for – Battery charging terminal **TRUE**
- 32) HRC stands for – High Rate capacity **FALSE**
- 33) UJB stands for – Under slung junction box **FALSE**
- 34) AH stands for – Ampere Hour **TRUE**
- 35) FDB stands for – Fixed distribution board **FALSE**
- 36) Sulphation occurs due to the battery discharged in short time **FALSE**
- 37) Mark of float guide indicates maximum electrolyte is lower mark **FALSE**
- 38) Each monoblock battery consists of 12 cells **FALSE**
- 39) The field resistance of TL 110V 4.5 kw is 4.5 ohms **TRUE**
- 40) For checking of tension of ' V ' belt after fitment no go gauge is used **FALSE**

Air Condition (AC)

- 41) Expansion valve expands the gas irrespective of load **FALSE**
- 42) M – 22 gas is used in RMPU'S **TRUE**
- 43) Refrigerant requirement in U/S AC plant is approximate 27 Kg **FALSE**
- 44) Refrigerant requirement in RMPU AC plant is approximate 15 Kg **FALSE**
- 45) Vane relay ensured that blower motor has started before switching on compressor. **TRUE**
- 46) One coach (RMPU) is having 4 Nos. of inverters **FALSE**
- 47) BCK compressors are sealed compressor **TRUE**
- 48) Manu rope compressors are sealed compressor **TRUE**

- 49) ACCEL compressors are sealed compressor **FALSE**
- 50) Amps is the unit of current. **TRUE**
- 51) Wood is the bad conductor of electricity **TRUE**
- 52) For fires of electrical origin throwing water is most safe and efficient way extinguishing the fires. **FALSE**
- 53) MCB is used in circuits for overload protection. **TRUE**
- 54) VRLA batteries consume more water. **FALSE**
- 55) MCB stands for Main Circuit Board. **FALSE**
- 56) EFT stands for Emergency Flow terminal. **FALSE**
- 57) CFL indicates Compact Fluorescent Lamp. **TRUE**
- 58) UPS indicates Universal Power Supply. **FALSE**
- 59) The time taken to replace RMPU unit when compared to underslung unit is high. **FALSE**
- 60) The refrigerant R-132 is a eco-friendly gas. **TRUE**

ISOLATED

- 61) In the method of ultra sonic testing internal defect of welding can be found. **TRUE**
- 62) The colour of oxygen cylinder is blue. **FALSE**
- 63) Colour of DA cylinder is red. **TRUE**
- 64) In arc welding eyes to be protected against infra red and ultra violet rays. **TRUE**
- 65) AC is preferred for welding of non-ferrous metal for arc welding . **FALSE**
- 66) The open circuit voltage for arc welding is in the order of 40-95 Volts. **TRUE**
- 67) The material used to coat the welding electrode is called shield. **FALSE**
- 68) Tungsten type of electrode is used for TIG welding. **TRUE**
- 69) Pre-heating is not essential for welding of cast iron **FALSE**
- 70) To cut heavy thick MS sheets light size nozzle i.e. 1/32"to be used during gas cutting. **FALSE**
- 71) Oxygen cylinders are measured in cubic meters. **TRUE**
- 72) Corrosion results strengthening of the material. **FALSE**
- 73) Fluorescent paint is used at end walls of SLR. **TRUE**
- 74) Hatching will be carried out on all GS coaches. **TRUE**
- 75) For spray painting carbondioxide is required. **FALSE**
- 76) Powder coating is provided on metals to avoid corrosion. **TRUE**
- 77) Stirring machine is used for proper mixing of paints. **TRUE**