Uka Tarsadia University (Diwaliba Polytechnic)
Diploma in Electrical Engineering
MCQ / True and False (Electric Traction - 1)

UNIT 1: GENERAL FEATURES OF TRACTIONS SYSTEMS

1. Main traction systems used in India are those using steam engine locomotives.
   T
2. Main traction systems used in India are those using diesel engine locomotives.
   T
3. Main traction systems used in India are those using diesel-electric engine locomotives.
   T
4. Main traction systems used in India are those using electric engine locomotives.
   T
5. Diesel electric traction has comparatively limited overload capacity because diesel engine is a constant output prime mover.
   T
6. The range of horse power of diesel locomotives is 1,500 - 2,500.
   T
7. Diesel electric traction has comparatively limitedoverload capacity because
   diesel engine is a constant output prime mover.
   diesel engine has shorter life span.
   regenerative braking cannot be employed.
   diesel-electric locomotive is heavier than an ordinaryelectric locomotive.
8. The range of horse power of diesel locomotives is
   100 - 500
   1,500 - 2,500
   3,000 - 4,500
   4,500 - 5,000
9. In India, diesel locomotives are manufactured at Varansi.
   T
10. Battery operated trucks are used for local delivery of goods in large towns with maximum daily run up to 50 - 60 km.
    T
11. Battery operated trucks are used for in narrow gauge traction.
    F
12. Battery operated trucks are used for main line service.
    F
13. Electric traction is meant locomotion in which the driving (or tractive) force is obtained from electric motors.
    T
14. Electric traction has high starting torque.
    T
15. Electric traction has less maintenance cost.
    T
16. Electric traction has free from smoke and flue gases.

T

17. Traction system mainly classify in _____________.
    Electrical and mechanical traction system
    Rotation and mechanical traction system
    Electrical and non-electrical traction system
    Electrical and rotation Traction system
18. Electric Traction Systems involve the use of electric energy at some stage or the other.
    T
19. The steam engine has a very low thermal efficiency of about 6-8 percent.
    T
20. Diesel-electric traction provides greater tractive effort as compared to steam engine.
    T
21. Diesel-electric traction provides less tractive effort as compared to steam engine.
    F
22. Diesel-electric traction provides same tractive effort as steam engine.
    F
23. Diesel-electric locomotive is more efficient than a steam locomotive.
    T
24. Diesel-electric locomotive is less efficient than a steam locomotive.
    F
25. Diesel-electric locomotive is more efficient than an electric locomotive.
    F
26. Diesel-electric locomotive is less efficient than an electric locomotive.
    T
27. Life of a diesel engine is comparatively shorter.
    T
28. Diesel-electric locomotive is heavier than plain electric locomotive.
    T
29. Regenerative braking cannot be employed though rheostatic braking.
    T
30. Battery – Electric drive have low maintenance cost and are free from smoke.
    T
31. The first traction system was started by steam drive.
    T
32. Direct current at 600-750 V is employed for tramways in urban and suburban railways.
    T
33. Direct current at 1500-3000 V is employed for tramways in urban and suburban railways.
    T
34. Which of the following is ideal requirement of traction system?
    A traction should have high starting torque
    It should have large over load capacity for short duration of time
    It should have smooth braking system
    All of the above
35. In non-electrical traction system which drives is used?
    Steam engine drive
    IC engine drive
    Both A and B
    None of the above
36. Kando system is type of ______________.
    DC system
    AC system

Composite system
None of the above

37. Kando system is type of DC system.
F
38. Kando system is type of AC system.
F
39. Kando system is type of composite system.
T
40. In DC system of track electrification operated at 1500-3000 voltage is used for _________.
Tramways
Trolley buses
Main line service
None of the above
41. Distance between two stations in Main line service?
More than 10 km
less than 10 km
Equal to 10 km
None of the above
42. Single phase low frequency AC system works at _________.
30 Hz
25 Hz
15 Hz
10 Hz
43. Distance between two stations in Main line service is more than 10 km.
T
44. Distance between two stations in Main line service is less than 10 km.
T
45. Single phase low frequency AC system works at 30 Hz.
F
46. Single phase low frequency AC system works at 25 Hz.
T
47. DC motors are better suited for frequent and rapid acceleration of heavy trains than ac motors
T
48. The conductor rail for dc distribution system is less costly, both initially and in maintenance than the high-voltage overhead ac distribution system.
T
49. Dc system causes no electrical interference with overhead communication lines.
T
50. In three phase low frequency AC sytem overhead contact wire system becomes complicated at crossings and junctions.
T
51. Battery driven vehicles________
are easy to control and very convenient to use.
have low maintenance cost.
cause no pollution.
all of the above.
52. Electric traction in comparison to other traction systems has the advantage(s) of
higher acceleration and braking retardation.
cleanest system and so ideally suitable for the underground and tube railways.
better speed control.
all of the above.

53. Electric railway can handle the traffic up to double the amount possible with steam railway. It is because of larger passenger carrying capacity and higher schedule speed.
T
54. Electric traction in comparison to other traction systems has the drawback(s) of
interference with communication lines running along the track.
heavy initial expenditure in laying out overhead electric supply system.
interruption of traffic-rot hours owing to short time power failure.
all of the above.
55. Maintenance requirements are minimum in case of
electric locomotives.
steam locomotives.
diesel electric locomotives.
diesel engines.
56. Ordinary tramway is the most economical means transport for
very dense traffic in large cities.
rural services.
suburban services.
None of the above
57. Ordinary tramway is the most economical means transport for very dense traffic in large cities.
T
58. Ordinary tramway is the most economical means transport for rural service.
F
59. Ordinary tramway is the most economical means transport for suburban services.
F
60. Advantages of 25-kv, 50-hz ac system
Light Overhead Catenary
Less Number of Substations
Flexibility in the Location of Substations
All of the above

UNIT 2: SPEED TIME CURVES

1. The speed time curve provided complete information of the motion of the train from starting to stoppage at next station.
   T
2. The area covered by the curve represents the distance covered by the train in the corresponding time.
   T
3. During rheostat acceleration period tractive effort remains constant hence acceleration is also maintained constant.
   T
4. At the end of acceleration period, the train attains maximum speed.
   T
5. At the end of acceleration period, the train attains minimum speed.
   F
6. Coasting period is also called as running without power period in traction.
   T
7. The rate of decrease of speed during coasting period is known as coasting retardation.
   T
8. In coasting period power supply to the motor is cut-off and train is allowed to run under its own momentum.
   T
9. At the end of coasting period retardation period starts.
   T
10. Speed time curve is different for different train services.
    T
11. Speed time curve is same for different train services.
    F
12. In main line service, the distance between two stops is more than 20 kms.
    T
13. In main line service free running period is longer duration than other period on speed time curve.
    T
14. In sub-urban services, the distance between two stops is 1 to 10 kms.
    T
15. In urban services, the distance between the two stops is comparatively very small (1 km).
    T
16. Crest speed is the maximum speed attained by the train during run.
    T
17. Average speed is the maximum speed attained by the train during run.
    F
18. Scheduled speed is the maximum speed attained by the train during run.
    F
19. Scheduled speed is the ratio of distance between two stops and the total time of run including stoppage time is known as scheduled speed.
    T
20. Acceleration is the rate of rise of speed.
    T
21. Retardation is the rate of fall of the speed when brakes are applied.
    T
22. Coasting Retardation is the rate of fall of speed when power is cut-off when train moves on its

own momentum.
T
23. Actual time of run is the total time required by the train to cover distance between the two stations.
T
24. Stoppage time is the time of stoppage of train at station
T
25. Time of acceleration is the time between the train starts for journey and reaches to a maximum speed.
T
26. Time of Retardation is the time between applications of brake to the train stoppage.
T
27. Increase in rate of acceleration & retardation decrease in actual time of run & increase schedule speed.
T
28. Schedule speed is increase by reducing stoppage time.
T
29. The speed time curve for main line services can be replaced by a trapezoid shape.
T
30. The speed time curve for urban and sub urban services can be replaced by quadrilateral speed time cure.
T
31. Schedule speed is _______________by reducing stoppage time.
Increased
Decreased
Both a and b
None of the above
32. Components of main line speed time curve are___________
Acceleration
Free running
Coasting and Retardation
All of the above
33. Components of sub urban line speed time curve are___________
Acceleration
Coasting
Retardation
All of the above
34. Components of urban line speed time curve are___________
Acceleration
Coasting
Retardation
All of the above
35. At the end of acceleration period, the train attains____________ speed.
maximum
minimum
Both a and b
None of the above
36. In main line service, the distance between two stops is _________
more than 20 kms
in between 1 to 10 kms
less than 1 km

none of the above

37. In sub urban line service, the distance between two stops is ________
    more than 20 kms
    in between 1 to 10 kms
    less than 1 km
    none of the above
38. In urban line service, the distance between two stops is ________
    more than 20 kms
    in between 1 to 10 kms
    less than 1 km
    none of the above
39. In coasting period power supply to the motor is on and train is allowed to run under its own momentum.
    F

UNIT 3: MECHANICS OF TRAIN MOVEMENT

1. The schedule speed of a given train when running on a given service is affected by
   acceleration and braking retardation.
   maximum or crest speed.
   duration of stop.
   all of the above
2. Skidding of a vehicle always occurs when
   braking effort exceeds its adhesive weight.
   brake is applied suddenly.
   it negotiates a curve.
   it passes over points and crossings.
3. The adhesive weight is the
   total weight of the locomotive and the train.
   weight coming over the driving wheels.
   same as the accelerating weight.
   none of the above
4. Coefficient of adhesion is the ratio of tractive effort to slip the wheels and.
   dead weight.
   accelerating weight.
   adhesive weight.
   none of the above.
5. The normal value of coefficient of adhesion is
   0.25
   0.35
   0.50
   0.65
6. Coefficient of adhesion reduces due to the presence of
   dew on rails.
   oil and grease on rails.
   dry sand on rails.
   both (a) and (b).
7. Coefficient of adhesion improves due to presence of
   dry sand on rails.
   rust on rails.
   dust on rails.
   all of the above.
8. The value of coefficient of adhesion will be high when rails are
   wet.
   cleaned with sand.
   greased.
   sprayed with oil.
9. The coefficient of adhesion for wet or greasy rails is
   0.35
   0.25
   0.08
   zero
10. The coefficient of adhesion
    same on dc and ac traction.
    high in ac traction and low in dc traction.

high in dc traction and low in ac traction.
any of the above.

11. Higher value of tractive effort can be used in electric traction as compared to steam traction because of greater adhesive weight.
T
12. When a bogie negotiates a curve, reduction in adhesion occurs resulting in sliding. This sliding is acute when
degree of curvature is more.
wheel base of axles is more.
none of the above.
both (a) and (b).
13. For a given maximum axle load tractive effort with ac locomotive will be
less than that of dc locomotive.
more than that of dc locomotive.
equal to that of dc locomotive.
none of the above.
14. The resistance encountered by a train in motion is on account of
resistance offered by air.
friction at the track.
friction at various parts of the rolling stock.
all of the above.
15. The air resistance to the movement of the train is proportional to (speed)^2**.**
T
16. The friction at the track is proportional to speed.
T
17. The friction at the track is proportional to (speed)^3
F
18. Tractive effort of an electric locomotive can be increased by
using high output motors.
increasing the supply voltage.
increasing dead weight over the driving axles.
both (a) and (c).
19. A locomotive with a mass of 50,000 kg on a track whose coefficient of adhesion is 20 per cent will produce a tractive effort of (approximately)
1 kN
100 kN
25 kN
250 kN
20. Energy consumption in propelling the train is required for
accelerating of train mass.
overcoming the gradient while moving up the gradient.
overcoming the train resistance.
all of the above.
21. Longer coasting period for a train results in
higher schedule speed.
lower specific energy consumption.
higher retardation.
higher acceleration.
22. Specific energy consumption is affected by
acceleration and retardation values.
the crest speed and nature of route.

distance between stops.
all of the above.
23. Specific energy consumption is minimum in_________services.
main line
urban
suburban
equal for all type of
24. Specific energy consumption
increases with the increase in maximum speed.
decreases with the increase in maximum speed.
is independent of maximum speed.
none of the above.
25. If the speed-time curves are similar (not identical), the specific energy consumption of the curve having higher maximum speed is equal than that of lower maximum speed.
T
26. Specific energy consumption becomes
more when distance between stops is more.
more with the higher values of acceleration (or retardation).
more with high train resistance.
less with the increase in crest speed.
27. The specific energy consumption for suburban services is usually ____________watt-hours per tonne-km.
20 - 30
30 - 45
50 - 75
100 - 150
28. The specific energy consumption for main line services is around______ watt hours per tonne-km.
20 - 30
30 - 45
50 - 75
100 - 150
29. Specific energy consumption is maximum in ………. services.
urban
suburban
main line
equal for all types of
30. The schedule speed of a given train when running on a given service is affected by acceleration and braking retardation.
T
31. The schedule speed of a given train when running on a given service is affected by maximum or crest speed.
T
32. The schedule speed of a given train when running on a given service is affected by duration of stop.
T
33. Skidding of a vehicle always occurs when braking effort exceeds its adhesive weight.
T
34. Skidding of a vehicle always occurs when brake is applied suddenly.
F
35. Skidding of a vehicle always occurs when it negotiates a curve.
F

36. Skidding of a vehicle always occurs when it passes over points and crossings.
F
37. The normal value of coefficient of adhesion is 0.25.
T
38. The normal value of coefficient of adhesion is 1.
F
39. Specific energy consumption is minimum in main line services.
T
40. Specific energy consumption is minimum in urban line services.
F
41. Specific energy consumption is minimum in sub-urban line services.
F
42. Energy consumption in propelling the train is required for accelerating of train mass.
T
43. Energy consumption in propelling the train is required for overcoming the gradient while moving up the gradient.
T
44. Energy consumption in propelling the train is required for overcoming the train resistance.
T
45. The specific energy consumption for main line services is around 20 – 30 watt hours per tonne-km.
T
46. The specific energy consumption for main line services is around 41– 50 watt hours per tonne-km.
F
47. The specific energy consumption for sub urban line services is around 50 – 75 watt hours per tonne-km.
T
48. The specific energy consumption for sub urban line services is around 20 – 25 watt hours per tonne-km.
F
49. Longer coasting period for a train result in higher schedule speed.
F
50. Longer coasting period for a train result in lower specific energy consumption.
T
51. Specific energy consumption increases with the increase in maximum speed.
T
52. Specific energy consumption decreases with the increase in maximum speed.
F
53. Specific energy consumption is independent of maximum speed.
F
54. Specific energy consumption is affected by acceleration and retardation values.
T

UNIT 4: TRACTION MOTORS

1. Selection of electric motors for traction purpose depends upon matching of characteristics, performance and electrical and mechanical features of traction duty.
   T
2. The electric motor used for traction work should be mechanically small in overall dimensions.
   T
3. The electric motor used for traction work should be light in weight and robust in construction.
   T
4. The electric motor used for traction work should be capable to withstand continuous vibrations.
   T
5. The electric motor used for traction work should be mechanically
   small in overall dimensions (especially in its overall diameter).
   light in weight and robust in construction.
   capable to withstand continuous vibrations.
   all of the above.
6. The electric motor used for traction work, electrically should be

   capable of developing high starting torque and withstanding voltage fluctuations, and temporary supply interruptions.

   amenable to simple speed control methods, self protective against excessive overloading and amenable to easy and simple methods of rheostatic and/or regenerative braking.

   of such characteristics that when they are operated in parallel and coupled mechanically, they share the load almost equal.

   all of the above.

7. The electric motor used for traction work, electrically should be capable of developing high starting torque and withstanding voltage fluctuations, and temporary supply interruptions.
   T
8. The electric motor used for traction work, electrically should be amenable to simple speed control methods, self protective against excessive overloading and amenable to easy and simple methods of rheostatic and/or regenerative braking.
   T
9. The electric motor used for traction work, electrically should be of such characteristics that when they are operated in parallel and coupled mechanically, they share the load almost equal.
   T
10. The electric motor used for traction work, electrically should not be be capable of developing high starting torque and withstanding voltage fluctuations, and temporary supply interruptions.
    F
11. In suburban trains, the traction motors are installed on
    locomotive only.
    locomotive and coaches.
    coaches only.
    None of the above
12. In suburban trains, the traction motors are installed on locomotive only.
    T

13. In suburban trains, the traction motors are installed on coaches only.
    F
14. In suburban trains, the traction motors are installed on locomotive and coaches only.
    F
15. The type of dc motor used in electric traction is
    series.
    shunt.
    separately-excited.
    none of the above.
16. The type of dc motor used in electric traction is series.
    T
17. The type of dc motor used in electric traction is shunt.
    F
18. The type of dc motor used in electric traction is separately excited
    F
19. The dc series motor is most suitable for traction services but more particularly for urban/suburban services because dc series motors are capable of developing high torque at start
    T
20. The dc series motor is most suitable for traction services but more particularly for urban/suburban services because dc series motors are suitable for regenerative braking.
    F
21. The dc series motor is most suitable for traction services but more particularly for urban/suburban services because dc series motors are capable of developing high torque at start.
    F
22. The dc series motor is most suitable for traction services but more particularly for urban/suburban services because
    dc series motors are suitable for regenerative braking.
    dc series motors are capable of withstanding rapid fluctuations in supply voltage.
    dc series motors are capable of developing high torque at start.
    dc series motors are capable of withstanding temporary interruption of supply without undue rush of current.

23. The three-phase induction motors have the advantages of simple and robust in construction, trouble free operation, high voltage operation consequently requiring reduced amount of current and automatic regeneration but are not suitable for traction work. This is because of their

    flat speed-torque characteristics, constant speed operation and low starting torque.
    complicated sped control system and complicated overhead feeding systems.
    higher initial as well maintenance cost.
    both (a) and (b).

24. DC shunt motors are not suitable for traction services because of their hard characteristics
    T
25. DC shunt motors are not suitable for traction services because of their large time constant.
    T
26. DC shunt motors are not suitable for traction services because of their power varying directly with developed torque.
    T
27. DC shunt motors are not suitable for traction services because of their wide variation in torque and flux due to variation in voltage in electric traction.
    T

28. DC shunt motors are not suitable for traction services because of their
    hard characteristics.
    large time constant.
    power varying directly with developed torque.
    all of the above.
29. Two dc shunt motors having identical characteristics are used drive a train car with unequal wheel diameters. The two motors will share load equally if they are connected in
    series.
    parallel.
    the loading will always be unequal.
    None of the above
30. For single-phase ac system of track electrification, low frequency is desirable as
    it improves commutation properties of ac motors.
    it increases efficiency of ac motors.
    it improves power factor of ac motors.
    all of the above.
31. At low frequency of the order of 1/2 Hz to 10 Hz, the induction motor develops
    high starting torque with excessive starting current.
    high starting torque without excessive starting current.
    low starting torque with excessive starting current.
    low starting torque without excessive starting current.
32. The traction motor must be strong enough to withstand continues vibration and other forces acting during running of train.
    T
33. The traction motor should capable of developing high starting torque.
    T
34. The traction motor has to start and stop frequently it must have easy, simple and economical speed control.
    T
35. The traction motor should be able capable of withstanding voltage fluctuation of the supply without affecting its normal performance.
    T
36. Speed torque and speed current characteristics of series motor is steep.
    T
37. Due to low weight and high starting torque developed, d.c. series motors are capable of producing high rate of acceleration.
    T
38. Full form of LIM is linear induction motor.
    T
39. A Linear Induction Motor (LIM) is an advanced version of rotary induction motor.
    T
40. In Linear Induction Motor, the stator and rotor are called primary and secondary.
    T
41. In Linear Induction Motor, the primary is mounted on the vehicle and the secondary is laid on the track.
    T

42. For single-phase ac system of track electrification, low frequency is desirable as it improves commutation properties of ac motors.
    T

43. For single-phase ac system of track electrification, low frequency is desirable as it decreases efficiency of ac motors.
F
44. Three phase induction motor is not suitable for traction purpose because low starting torque.
T
45. Three phase induction motor is not suitable for traction purpose because high starting current.
T
46. Three phase induction motor is not suitable for traction purpose because constant speed operation.
T
47. For supply on 25 kV, 50 Hz single phase, the suitable motor for electric traction is AC single-phase split phase motor.
F
48. For supply on 25 kV, 50 Hz single phase, the suitable motor for electric traction is AC single phase universal motor.
F
49. For supply on 25 kV, 50 Hz single phase, the suitable motor for electric traction is DC shunt motor.
F
50. For supply on 25 kV, 50 Hz single phase, the suitable motor for electric traction is DC series motor.
F
51. DC series motor is used in tramways.
T
52. DC shunt motor is used in tramways.
F
53. The speed torque characteristic of traction motor should be such that the speed may fall with the increase in load.
T
54. The speed torque characteristic of traction motor should be such that the speed may increases with the increase in load.
F
55. When AC supply to the series motor, due to alternating field flux produce.
T
56. Merits of three phase induction motor is trouble free operation.
T
57. Merits of three phase induction motor is higher maintenance.
F
58. Merits of three phase induction motor is regeneration.
T
59. Demerits of three phase induction motor is low starting torque.
T
60. Demerits of three phase induction motor is drawing heavy starting current
T

UNIT 5: TRACTION MOTORS CONTROL

1. When two or more motors are used for traction service, the method of speed control used will be rheostatic control.
   F
2. When two or more motors are used for traction service, the method of speed control used will be field control.
   F
3. When two or more motors are used for traction service, the method of speed control used will be series-parallel control.
   T
4. When two or more motors are used for traction service, the method of speed control used will be motor generator control.
   F
5. When two or more motors are used for traction service, the method of speed control used will be

   rheostatic control
   field control.
   series-parallel control.
   motor generator control.
6. The advantage of series-parallel starting is small energy loss and higher efficiency.
   T
7. The advantage of series-parallel starting is economical speed control.
   T
8. The advantage of series-parallel starting is higher reliability of operation.
   T
9. Parallel operation of traction motors is easier with dc shunt motors.
   F
10. Parallel operation of traction motors is easier with dc series motors.
    T
11. Parallel operation of traction motors is easier with induction motors.
    F
12. In motor-generator locomotive control rheostatic control is used.
    F
13. In motor-generator locomotive control series parallel control is used.
    F
14. In motor-generator locomotive control the output voltage of generator is regulated by means of field control from exciter.
    T
15. The method of speed control adopted in 25 kV, single-phase, 50 Hz traction is tap changing control of transformer.
    T
16. The method of speed control adopted in 25 kV, single-phase, 50 Hz traction is reduced current method.
    F
17. The method of speed control adopted in 25 kV, single-phase, 50 Hz traction is series-parallel control.
    F
18. The method of speed control adopted in 25 kV, single-phase, 50 Hz traction is rheostatic control
    F

19. The preferable method of speed control of linear induction motor is variable flux control.
F
20. The preferable method of speed control of linear induction motor is PAM control.
F
21. The preferable method of speed control of linear induction motor is variable frequency and constant voltage control.
T
22. The preferable method of speed control of linear induction motor is variable frequency and variable voltage control.
F
23. The preferable method of speed control of linear induction motor is
variable flux control.
PAM control.
variable frequency and constant voltage control.
variable frequency and variable voltage control
24. Which of the following braking systems on the locomotives is costly?
Vacuum braking on steam locomotives.
Vacuum braking on diesel locomotives.
Regenerative braking on electric locomotives.
All braking systems are equally costly.
25. Vacuum braking on steam locomotives is costly.
F
26. Vacuum braking on diesel locomotives is costly.
F
27. Regenerative braking on electric locomotives is costly.
T
28. Braking system employed in diesel electric traction is
hydraulic type.
vacuum type.
regenerative type.
any of these.
29. Braking system employed in diesel electric traction is hydraulic type.
F
30. Braking system employed in diesel electric traction is vacuum type.
T
31. Braking system employed in diesel electric traction is regenerative type.
F
32. The type of braking used in electric traction is
mechanical braking.
vacuum brake system.
electropneumatic braking.
both (a) and (c).
33. Vacuum is created by
vacuum pumps.
ejector.
vacuum pump or ejector.
none of the above.
34. Bo-Bo locomotives have two bogies with two driving axles with individual drive motors**.**
T.
35. A locomotive for Indian Railways has been designated as WAM. In this W indicates that the locomotive is to operate on broad gauge track.

T

36. The type of braking used in electric traction is mechanical breaking.
    F
37. The type of braking used in electric traction is vacuum brake system.
    F
38. The type of braking used in electric traction is electropneumatic braking.
    T
39. In regenerative braking energy consumption is saved.
    T
40. Regenerative braking is recommended only for locomotive operating in hilly areas.
    T
41. Regenerative braking is not recommended only for locomotive operating in hilly areas.
    F
42. Regenerative braking method provides better safety to the train while it is running.
    T
43. Plugging is the types of electric breaking in traction.
    T
44. Rheostatic breaking is the one kind of breaking system in traction.
    T
45. Full form of PWM is pulse width modulation.
    T
46. Amplitude modulation is the type of modulation system in traction.
    T
47. Frequency modulation is the type of modulation system in traction
    T
48. PWM modulation is the type of modulation system in traction.
    T

UNIT 6: AUXILIARY EQUIPMENT

1. The current collecting equipment collect all the current needed for the traction motors.
   T
2. In the electric traction system return path to the electric current from the traction motor is provided by the track rails.
   T
3. The current collecting equipment collect all the voltage needed for the traction motors.
   F
4. The conductor system is cheaper method.
   T
5. The conductor system is costlier method.
   F
6. O.H current collector system is used for electric traction system above 1500 volts. a.c and d.c.
   T
7. In India a.c track electrification has 25 kV single wire earth return system.
   T
8. Full form of SWER is single wire earth return system.
   T
9. The conductor rail system of current collection is generally used for sub-urban trains, tramways and trolley buses.
   T
10. The conductor rail is mounted on a porcelain support.
    T
11. When the conductor rail is in the middle of two track rails, it is 38 mm above the level of the track rail.
    T
12. When the conductor rail is at side of the track rail it is 76.2 mm above the level of the track rails.
    T
13. For conductor rail mechanical strength is so important than its conductivity.
    F
14. Top conductor rail system is used for 1200 V supply system.
    F
15. The conductor rail is guarded by E and F, which rests on the insulators.
    T
16. Top contact conductor rail system conductor rail is mounted on the porcelain insulator at one side of the track rail.
    T
17. Top contact conductor rail system is used for 600 V supply system.
    T
18. Side contact conductor rail system is used for 1200 V supply system.
    T
19. Bottom contact conductor rail system is used in countries having heavy ice fall.
    T
20. The continuity of the conductor rail is maintained by the flexible jumper rail.
    T
21. The current supply is collected from the conductor rail by means of a collector shoe.
    T
22. In the top contact system, the contact pressure is obtained by gravity.

T

23. By flexible joints, there will be a clearance gap is available for expansion and contraction of the rail in summer and winter seasons.
    T
24. When the traction system voltage exceeds 1200 volt, overhead current collection system is used.
    T
25. In overhead current collection system return path to the current is provided by means of track rails.
    T
26. The current from the overhead conductor is collected by means of a sliding contact.
    T
27. Cable collector is used for small operating distance.
    T
28. Cable collector is used where track route is exposed to dangerous gases, chemical, dust, dampness.
    T
29. Pole Collector type of O.H current collector has pole mounted on its base with hinge, which is mounted on the roof of the trolley bus or locomotive.
    T
30. In Pole collector type contact with overhead line conductor is made with the help of a spring.
    T
31. Pole collector is used for trolley buses having speed up to 20 to 32 kmphr.
    T
32. For forward and reverse running separated bow collectors are used.
    T
33. The bow collection strip is made up of copper, aluminum or carbon.
    T
34. In bow collector system there is danger of wheel jumping out of the contact wire.
    F
35. Bow collector type of O.H. collector system is used for high speed-tramways and trains.
    T
36. Pantograph collector is designed for high current capacity up to 2000 amp to 3000 amp.
    T
37. In India, air raised, gravity lowered pantograph collector method is adopted in most of the locomotives.
    T
38. Cross arm type diamond shaped pantograph occupies less space at the base.
    T
39. Pantograph current collector system can be used safely in both directions.
    T