University of Mumbai

Electric Traction

MCQ

Q1	
1	A train in coasting period
Option A:	Run at constant period
Option B:	Run on its on momentum
Option C:	Speed continuously increases
Option D:	Speed continuously decreases
2	Tractive force required to give linear acceleration to the train
Option A:	277.8 $W_e \alpha$
Option B:	277.8 $W_e sin\theta$
Option C:	9.81 $W_e \alpha$
Option D:	9.81 $W_e \alpha \ sin\theta$
3	The grooves in contact wire is used to attach
Option A:	Messenger wire
Option B:	Pantograph
Option C:	Dropper wire
Option D:	Catenary
4	Sag in a conductor wire is ------ to the tension in the conductor
Option A:	directly proportional
Option B:	Inversely proportional
Option C:	Independent
Option D:	Has no relation
5	The constraint which restricts number of vehicle attached to a locomotive is
Option A:	Length of platform
Option B:	Capacity of locomotive
Option C:	Train weight
Option D:	Length of platform, Capacity of locomotive, Train weight
6	Generally --------braking methods , combined with regenerative braking
Option A:	Plugging and rheostatic
Option B:	Plugging and mechanical brakes
Option C:	Rheostatic and mechanical brakes
Option D:	Plugging, rheostatic and mechanical brakes
7	The disadvantages of booster transformer feeding system in traction
Option A:	Problem due to voltage droop

Option B:	Unnecessary break in the catenary
Option C:	High current through the catenary
Option D:	All of the above
8	Bridging interrupter id used to
Option A:	Balance the three phase system
Option B:	To feed the supply from active phase section to the failed phase section adjacent to it
Option C:	To parallel the down track and up track
Option D:	To provide smooth transition of pantograph from one phase to other
9	Effect of stray current is more in
Option A:	Single line AC track circuit
Option B:	In both AC and DC track circuit
Option C:	AC track circuit
Option D:	DC track circuit
10	In automatic CAB warning system, if the driver fails to acknowledge the alarm within the set time
Option A:	Alarm will continue till the driver acknowledge the alarm
Option B:	Display changes to black and yellow
Option C:	Brake applied to the train
Option D:	Display remains as black
11	The limiting factor for the tractive effort applied from a motor at the driving wheel is decided by
Option A:	**Adhesive weight of the driving wheel**
Option B:	Weight transfer due to torque exerted by the traction motor
Option C:	Specific energy consumption
Option D:	Energy consumption
12	A 200 tonne motor cooch having 4 motors, each developing 6000 N-m torque during acceleration, starts from test. If gear ratio is 4, gear transmission efficiency 90%, wheel radius 45 cm, efficiency of motors 85%, the maximum power output of the motor is
Option A:	**2669 kW**
Option B:	**192000 kW**
Option C:	3140 kW
Option D:	1047 kW
13	30 kmph is the speed of a train on a level track. If the distance between station is 1 km and station stopping time is 20 sec, what is the schedule time of run
Option A:	**120 sec**
Option B:	100 sec
Option C:	220 sec
Option D:	20 sec

14	Adhesion is more in AC locomotive because
Option A:	Wheel slip detecting device is used
Option B:	Resistance control is used for speed control
Option C:	Resistance control is used for starting
Option D:	**Torque speed curves are more steep**
15	As per Self relieving property, In speed-torque characteristic, the product of speed and torque
Option A:	decreases
Option B:	**Remains constant**
Option C:	increases
Option D:	decreases for some time and then increases
16	One of the desirable characteristics of traction motor is
Option A:	Low power to weight ratio
Option B:	**High power to weight ratio**
Option C:	Moderate power to weight ratio
Option D:	Power to weight ration to be one
17	Multiple unit trains are mainly used for
Option A:	Long distance operation
Option B:	high density suburban operations
Option C:	Operation in hilly areas
Option D:	Operation in downward gradient
18	Which of the following drives is suitable for mines where explosive gas exists?
Option A:	Steam engine
Option B:	Diesel engine
Option C:	Battery locomotive
Option D:	Electric locomotive
19	Long distance railways use which of the following?
Option A:	200 V D.C.
Option B:	25 kV single phase A.C.
Option C:	25 kV two phace A.C.
Option D:	25 kV three phase A.C.
20	The free-running speed of a train does NOT depend on the

Option A:	duration of stops
Option B:	distance between stops
Option C:	running time
Option D:	acceleration.
21	The impact of 25 kV single phase ac system used for traction on the grid
Option A:	**Current unbalance and voltage unbalance**
Option B:	Current unbalance
Option C:	Voltage unbalance
Option D:	Harmonic injection
22	Distance between substations in traction application is decided by
Option A:	**Voltage regulation**
Option B:	**Cost of over head catenary system**
Option C:	Incentive to electrification
Option D:	Cost of copper used for electrification
23	Supply to the traction substation is provided from
Option A:	**double circuit 132 kV, 50 Hz three phase system**
Option B:	single circuit 132 kV, 50 Hz three phase system
Option C:	double circuit 25 kV, 50 Hz three phase system
Option D:	single circuit 25 kV, 50 Hz three phase system
24	To protect the system from lightning strokes ----- is preferred
Option A:	ground wires are used
Option B:	Single lightning arresters
Option C:	Ground wires and single lightning arresters
Option D:	**Multiple Lightning arresters**
25	Transformer protection in a traction substation includes
Option A:	Over load and over current
Option B:	**Over current, overload, earth fault**
Option C:	Earth fault and over current
Option D:	Over current
26	The most cost efficient method for supplying traction lighting and air conditioning load is
Option A:	End on generation
Option B:	Mid on generation
Option C:	Head on generation
Option D:	Battery diven system

27	In a single contact wire supported over head equipment used for tram car application, the distance between the two consecutive support is restricted to
Option A:	30 m
Option B:	25 m
Option C:	20 m
Option D:	40 m
28	To have an efficient protection against fault far away from substation beyond neutral section ------- relay is used
Option A:	Over current relay
Option B:	Under voltage relay
Option C:	MHO relay
Option D:	Differential relay
29	--------- is called encumbrance
Option A:	The axial distance between catenary and contact wire
Option B:	The axial distance between Mast and contact wire
Option C:	The axial distance between suspension clamp and contact wire
Option D:	The axial distance between steady arm and contact wire
30	The cross section of the copper wire used in traction OHE is decided based on
Option A:	Permissible temperature rise of the contact wire and acceptable voltage drop
Option B:	Traffic density
Option C:	Track gradient
Option D:	Time schedule

DESCRIPTIVE QUESTIONS

1.	Explain the process of maintenance of battery
2.	Exemplify the advantages of 25 kV ac system over DC system
3.	Derive the expression for specific energy consumption and illustrate the effect of various factors on specific energy consumption
4.	400 tonne goods train is to be hauled by a locomotive up a gradient of 20% with acceleration of 1 kmphps. Coefficient of adhesion is 20 %, track resistance 40 n/tonne and effective rotating mass 10% of dead weight. Find the weight of locomotive and number of axles, if axle load is not to increase beyond 22 tonne.
5.	Explain the desirable characteristics of traction motors
6.	Suggest a drive for traction which has following features, dynamic braking, regenerative braking and composite braking. Illustrate its operation with neat circuit diagram
7.	Write short notes on a. Interlocking CAB signalling
8.	Illustrate the causes, classification and effect of EMI in traction

9.	Illustrate with neat diagram the scott connection feeding system and booster transformer feeding system used in traction
10.	Illustrate with neat diagram the various protection arrangements in traction substation
11.	Illustrate with neat diagram the catenaries used in traction
12.	Exemplify the various design aspects considered for traction contact wires
13.	"Bridging interrupter are located across neutral section" Justify the reason. Also illustrate the significance of bridging interrupter and neutral sections
14.	Illustrate with neat diagram the working of $2 \times 25\ kV$ autotransformer fed system used in traction. How this system overcomes the disadvantages of booster transformer fed traction.
15.	Illustrate the current collection methods used in traction. Which method is preferred for current collection and why
16.	Illustrate the design requirements of catenary wire, contact wire, automatic weight tensioning system and section insulator used in traction
17.	Compare electric traction with other system of tractions
18.	Illustrate the potentialities of Kando system for it is being adopted in traction
19.	Illustrate the merits and demerits of DC system of track electrification
20.	Illustrate the role of battery banks in traction