Subject: - Automobile Engineering (22656)

SYLLABUS

Chapter No.	Name of chapter	Marks With Option
1	Introduction to automobiles	10
2	Automobile Transmission Systems	14
3	Automobile control Systems	10
4	Automobile suspension, wheels and tyres	12
5	Automobile electrical and electronics systems	14
6	Motor vehicle Act, Road safety and garage practices	10
	Total Marks: -	**70**

BOARD THEORY PAPER PATTERN FOR AEN (22656)

Q.1		**Attempt any FIVE** **2*5=10**
	a)	Introduction to automobiles
	b)	Automobile Transmission Systems
	c)	Automobile control Systems
	d)	Automobile suspension, wheels and tyres
	e)	Automobile electrical and electronics systems
	f)	Selection of Ant frictional bearing and gears
Q.2		**Attempt any THREE** **4*3=12**
	a)	Introduction to automobiles
	b)	Automobile Transmission Systems
	c)	Automobile control Systems
	d)	Automobile suspension, wheels and tyres
Q.3		**Attempt any THREE** **4*3=12**

	a)	Introduction to automobiles
	b)	Automobile suspension, wheels and tyres
	c)	Automobile electrical and electronics systems
	d)	Introduction to automobiles
	e)	Automobile suspension, wheels and tyres
Q.4		**Attempt any TWO** **2*6=12**
	a)	Introduction to automobiles
	b)	Automobile Transmission Systems
	c)	Automobile control Systems
Q.5		**Attempt any TWO** **6*2=12**
	a)	Automobile control Systems
	b)	Automobile suspension, wheels and tyres
	c)	Motor vehicle Act, Road safety and garage practices
Q.6		**Attempt any TWO** **6*2=12**
	a)	Automobile suspension, wheels and tyres
	b)	Automobile electrical and electronics systems
	c)	Automobile control Systems

CLASS TEST - I

PAPER PATTERN

COURSE: - Automobile Engineering (22656)

PROGRAMME: - Mechanical Engineering

Syllabus: -

Unit No.	Name of the Unit	Course Outcome (CO)
1	**Introduction to automobiles**	**CO-656.01**
2	**Automobile Transmission Systems**	**CO-656.02**
3	**Automobile control Systems**	**CO-656.03**

Q.1	Attempt any FOUR 4*2=8Marks	Course Outcome (CO)
a)	Introduction to automobiles	CO-656.01
b)	Automobile Transmission Systems	CO-656.02
c)	Automobile control Systems	CO-656.03
d)	Introduction to automobiles	CO-656.01
e)	Automobile Transmission Systems	CO-656.02
f)	Automobile control Systems	CO-656.03
Q.2	**Attempt any THREE 3*4=12 Marks**	
a)	Automobile Transmission Systems	CO-656.02
b)	Introduction to automobiles	CO-656.01
c)	Automobile control Systems	CO-656.03

CLASS TEST - II

PAPER PATTERN

COURSE: - Automobile Engineering (22656)

PROGRAMME: - Mechanical Engineering

Syllabus: -

Unit No.	Name of the Unit	Course Outcome (CO)
4	Automobile suspension, wheels and tyres	CO-656.04
5	Automobile electrical and electronics systems	CO-656.05
6	Motor vehicle Act, Road safety and garage practices	CO-656.06

Q.1	Attempt any FOUR 4*2=8Marks	Course Outcome (CO)
a)	Automobile suspension, wheels and tyres	CO-656.04
b)	Automobile electrical and electronics systems	CO-656.05
c)	Motor vehicle Act, Road safety and garage practices	CO-656.06
d)	Automobile suspension, wheels and tyres	CO-656.04
e)	Motor vehicle Act, Road safety and garage practices	CO-656.06
f)	Automobile electrical and electronics systems	CO-656.05
Q.2	**Attempt any THREE 3*4=12 Marks**	
a)	Motor vehicle Act, Road safety and garage practices	CO-656.06
b)	Automobile electrical and electronics systems	CO-656.05
c)	Automobile suspension, wheels and tyres	CO-656.04

COURSE OUTCOME (CO)

COURSE: - Automobile Engineering (22656)

PROGRAMME: - Mechanical Engineering

CO. NO.	Course Outcome
CO-656.01	Prepare the vehicle layout with chassis specification.
CO-656.02	Interpret power flow diagrams of transmission systems.
CO-656.03	Select suitable braking and steering systems for different applications.
CO-656.04	Select appropriate type of wheel and tyre for given application.
CO-656.05	Prepare simple electrical-electronics circuit for automobile systems.
CO-656.06	Select service tools for relevant service operation in automobile shops.

1. Introduction to automobiles (Total Marks = 10)

Position in Question Paper **Total Marks-20**

Q.1. a) 2-Marks.
Q.2. a) 4-Marks.
Q.3. a) 4-Marks.
Q.3. d) 4-Marks.
Q.4. a) 6-Marks.

Descriptive Question

1. State the various requirements of automobile body.
2. State the various types of automobile bodies.
3. Explain the importance of aerodynamic shape of a car body.
4. Name any four major components of automobile and state their function.
5. Give the classification of automobiles.
6. What are the major components mounted on vehicle chassis? State the purpose of each component.
7. Draw the layout of four wheel drive vehicle. State the advantages and disadvantages.
8. State the advantages of LPG and CNG operated vehicles.
9. Write advantages of front engine front wheel drive vehicle.
10. State advantages and disadvantages of Gas (LPG, CNG) operated automobiles.
11. Draw four wheeler chassis layout and show major components on it.
12. State the importance of Aerodynamic body shapes in car and write any four advantages of it.
13. Compare front engine rear wheel drive with front engine front wheel drive.
14. Explain different types of automobile chassis.
15. State and explain different forces acting on the vehicle body related to aerodynamics

MCQ Question

(Total number of Question= Marks*3=10*3=30)

Note: Correct answer is marked with **bold.**

1. **The temperature indicating instrument in vehicles indicates the temperature of**
   a) **Jacket cooling water**
   b) Lubricating Oil
   c) Engine Cylinder
   d) Engine Piston
2. In which year was the first automobile built?
   a) 1759
   b) 1769
   c) 1785
   d) 1790
3. Onesiphare Pacqueur invented which one of these?
   a) Differential
   b) Steering Wheel
   c) Gear Box
   d) IC Engine
4. Trucks and Buses use which type of fuel?
   a) Petrol
   b) LPG
   c) Diesel
   d) CNG
5. A conventional suspension system uses which of these?
   a) Coil Spring
   b) Double-A
   c) Torsion Bar
   d) Leaf spring
6. Hindustan Motors Limited, Calcutta was setup in which year
   a) 1943
   b) 1942
   c) 1950
   d) 1945
7. Which of these is not necessary for the description of an automobile?
   a) Type
   b) Color
   c) Capacity
   d) Model
8. 'Maruti 800' is a _____
   a) Sub-compact car
   b) Compact car
   c) City car
   d) Sport car
9. Which of these cars is a Crossover SUV?
   a) Hyundai Sonata
   b) Nissan Pathfinder
   c) Fiat Panda
   d) Suzuki Servo
10. Which of these is necessary for the description of an automobile?
    a) Capacity
    b) Model
    c) Make
    d) All of the mentioned

11. Which of these is a compact executive car?
    a) Mercedes-Benz S Class
    b) Audi A4
    c) Mercedes-Benz E Class
    d) Audi A8
12. A Roadster is a convertible with how many seats?
    a) Two
    b) Four
    c) One
    d) Three
13. Two door and four door type automobiles are classified as
    a) Sedan
    b) Convertible
    c) Special purpose vehicles
    d) Pick ups
14. Which of these falls under LMV (Light Motor Vehicle) category based on capacity?
    a) Motor-bike
    c) Buses
    b) Cars
    d) Trains
15. A delivery van falls under the category of which type of vehicles.
    a) Heavy passenger vehicles
    b) Light passenger vehicles
    c) Heavy goods vehicles
    d) **Light goods vehicles**
16. Load per axle for a vehicle can be reduced by which of the following methods.
    a) By increasing distance between the axles
    b) By increasing the number of tyres
    c) By increasing the number of axles
    d) By decreasing the length of an axle
17. Abbreviation HEVs stands for what
    a) Highly Efficient Vehicles
    b) Hybrid Electric Vehicles
    c) Highly Economic Vehicles
    d) Highly Engineered Vehicles
18. Why is the term ‘Cabriolet’ used for a car?
    a) Because of non-foldable roof
    b) Because of foldable roof
    c) Because it is a coupe
    d) Because it has Higher ground clearance

19. What is the power delivered by the engine to the crankshaft called?

a) Shaft power
b) Brake power
c) Horse power
d) None of the mentioned

20. If 'T' is torque (in Nm) and 'N' is speed (in rpm) then the required expression for Brake power 'B.P' in kWs is _____

a) 2πNT/6000
b) 2πNT/60000
c) πNT/6000
d) πNT/60000

21. The torque available at the contact between road and driving wheel is called _____.

a) Brake power
b) Friction power
c) Tractive effort
d) Engine torque

22. Which of these is not a power loss which takes place between engine and driving wheel?

a) Power loss due to friction of piston bearings and gears
b) Power loss from clutch to drive wheel due to friction of various parts
c) Transmission line loss
d) None of the mentioned

23. Rolling resistance does not depend on which of the following factors?

a) Load on each road wheel
b) Radius of driving wheel
c) Wheel inflation pressure
d) Nature of road surface

24. For an average type of road surface what percentage of vehicle's weight constitutes rolling resistance?

a) 5 to 10%
b) **1 to 2%**
c) 2 to 5%
d) 0 to 3%

25. The transmission system transmits _____ from engine to wheels.

a) Speed
b) Power
c) Current
d) Pressure

26. Which of the following is not a part of the transmission system?

a) Clutch
b) Wheels
c) Axles
d) Gear box

27. The loads supported by an automobile frame are _____

a) Weight of the body, passengers and cargo loads
b) Torque from engine and transmission
c) Sudden impacts from collisions
d) **All of the mentioned**

28. An automobile chassis does not include which one of the following parts?

a) Shock absorbers
b) Steering system
c) Differential
d) Brakes

29. What are 'Air Dams'?

a) Spoilers at the front of a vehicle
b) Spoilers at the rear of a vehicle
c) Spoilers at the sides of a vehicle
d) Spoilers at the top of a vehicle

30. An upraised part on the hood which directs the air flow into the engine compartment is called

a) Spoiler
b) Hotpipe
c) Hood scoop
d) Wings

2. Automobile Transmission Systems

(Total Marks = 14)

Position in Question Paper **Total Marks-14**

Q.2. c) 4-Marks.
Q.3. b) 4-Marks.
Q.4. b) 6-Marks.

Descriptive Question

1. State the necessity of transmission system in automobile.
2. Sketch and explain chassis layout of front engine rear wheel drive.
3. (i) State the functions of clutch. (ii) Explain with neat sketch, the working of Diaphragm type clutch.
4. (i) State the function of slip joint provided on propeller shaft. (ii) State the necessity of universal joints used in propeller shaft.
5. Explain with neat sketch working of constant mesh gear box.
6. State the need of differential. Explain with neat sketch construction and working of differential.
7. Explain the necessity and working of single plate clutch with neat sketch.
8. Why differential is needed? Draw neat sketch of differential.
9. Explain the working of epicyclic gear box with neat sketch.
10. Justify use of universal and sliding joints in propeller shaft.
11. List requirements of steering system.
12. Draw neat sketches for diaphragm spring type clutch in engage and disengage position. Name the components.
13. Draw neat sketch of overdrive and explain its working.
14. Explain the concept of double declutching related to constant mesh gear box.
15. Explain with sketch construction and working of epicyclic gear box.
16. State the requirements of transmission system. List the components of it and write function of each component in one line.
17. Explain the working of transfer case with sketch and give its application.
18. Explain the construction and working of diaphragm type of clutch.

19. Explain the construction and working of synchromesh gear box.
20. Explain with neat sketch the working of semi floating rear axle.
21. Explain with neat sketch working of constant mesh gear box.
22. Describe with neat sketch single plate clutch.
23. Why differential is used in automobile? Explain working of differential.
24. State different types of real axle. Explain working of any one.
25. Explain construction and working of two wheeler gear box.

MCQ Question

(Total number of Question=Marks*3=14*3=42)

Note: Correct answer is marked with **bold**

1. If there are 7 clutch plates in a multi-plate clutch, what is the number of pair of contact surfaces?
a) 5
b) 4
c) 6
d) 8

2. In External diameter of the clutch facing is limited to 120 mm and the inner diameter may be assumed to be 0.3 times the external diameter. Assume uniform wear theory. What is the effective mean radius?
a) 68
b) 58
c) 98
d) 78

3. The clutch plate has 160 mm inside and 240 mm outside diameter. The total force provided by the springs is 5 kN, when the clutch is new. The coefficient of friction is 0.4. What is the torque transmitted?
a) 300 Nm
b) 350 Nm
c) 400 Nm
d) 450 Nm

4. Which of the following contains no linkage between the clutch and the pedal?
a) Clutch – by – wire
b) Wet clutch
c) Hydraulic single plate clutch
d) Hydraulic multi plate clutch

5. Where is the clutch located?
a) Between transmission and engine
b) Between transmission and rear axle
c) Between transmission and propeller shaft
d) Between transmission and differential

6. Which of the following parts of the cover assembly that hold the pressure plate against the clutch plate?

a) Springs b) Thrust Bearing
c) Struts d) Lever

7. Which of the following is the coefficient of friction of the clutch plate?

a) Springs b) Thrust Bearing
c) Struts d) Lever

8. In the levers of first type, the mechanical advantage is_____

a) less than 1 b) equal to 1
c) greater than 1 d) Can't say

9. The distance between fulcrum and dead weights is 100mm. Dead weights are of 2945.2N. An effort of 294.52N acts on the other hand. Find the distance between the fulcrum and other end of the lever.

a) 100 mm b) 10mm
c) 1000 mm d) 10000 mm

10. If joint is to fail by crushing of socket collar then estimate the diameter of socket collar. Given Permissible compressive stress= 126.67 N/mm^2.; Spigot dia=65mm; thickness of collar=15mm

a) 139 mm b) 141 mm
c) 131 mm d) 149 mm

11. Determine the width of the cotter used in cotter joint connecting two rods subjected to axial load of 50kN and permissible shear stress in cotter is 50 N / (mm^2). Given thickness of cotter=10mm

a) 100 mm b) 150 mm
c) 50 mm d) 25 mm

12. Knuckle Joint can't be used to connect two intersecting rods.

a) Yes
b) No, it can't be used
c) It can be used with some modifications
d) It is expensive and hence isn't used

13._____ of the following are important parts of knuckle joint.

a) Pin b) Eye
c) Each of the mentioned d) Fork

14. Find dia. of knuckle pin for knuckle joint transmitting power 60kN. The permissible stresses in tension, shear and compression are 70MPa, 55 MPa and 130 MPa respectively.

a) 26 mm
b) 30 mm
c) 28 mm
d) 32 mm

15. Calculate the diameter of pin from shear consideration with maximum shear stress allowed is 40NN/mm² and an axial tensile force of 50kN is acting on the rod.

a) 44 mm
b) 49 mm
c) 39 mm
d) 52 mm

16. In the links of suspension chains_____

a) a cottor joint is used
b) Both are used
c) a knuckle joint is used
d) None is used

17. The loose knuckle pin in the fork will be subjected to _____

a) Shearing
b) Crushing
c) Bending
d) tearing

18. The maximum effort applied by hand is _____

a) 200 N ~ 300 N
b) 400 N ~ 500 N
c) 300 N ~ 400 N
d) All the above

19. Find dia. of tie rod of turn buckle subjected to pull of 5 kN. The rod and nut are made of Fe E 380and factor of safety is 5.

a) 10 mm
b) 16 mm
c) 14 mm
d) 12 mm

20. A right-angled bell-crank is designed to raise a load of 5kN at short arm whose length is 100mm. Longer arm is of length 500mm. Calculate the reaction or force acting on the fulcrum.

a) 5.1
b) 6.1
c) 5.8
d) 6.8

21. Which of the following is the need of the gearbox?

a) To vary the speed of the vehicle
b) To vary the torque of the vehicle
c) To vary the power of the vehicle
d) To vary the acceleration of the vehicle

22. In which type of manual transmission the double-declutching is used?

a) Constant-mesh gearbox
b) Sliding mesh gearbox
c) Synchromesh gearbox
d) Epicyclical gearbox

23. In which of the gearbox all gears are always in contact?

a) Constant-mesh gearbox
b) Sliding mesh gearbox
c) Synchromesh gearbox
d) Epicyclical gearbox

24. In which of the gearbox sun and planet gear set is used?

a) Constant-mesh gearbox
b) Sliding mesh gearbox
c) Synchromesh gearbox
d) Epicyclical gearbox

25. Where is the overdrive located?

a) Constant-mesh gearbox
b) Sliding mesh gearbox
c) Synchromesh gearbox
d) Epicyclical gearbox

26. Where is the overdrive located?

a) Between transmission and engine
b) Between transmission and rear axle
c) **Between transmission and propeller shaft**
d) Between transmission and differentia

27. The purpose of transmission is an automobile is

a) To vary the speed of automobile,
b) To vary the torque at road wheel of vehicle
c) To vary the power of automobile,
d) None of these

28. Mechanical transmission can be of following class

a) **Clutch, gearbox and live axle transmission**
b) Clutch, gearbox and dead axle transmission
c) Clutch, gearbox and axle less transmission,
d) All of these

29. Transfer case is located next to the gearbox in

a) Front wheel drive
b) Rear wheel drive
c) Four wheel drive
d) All of these

30. The following type of transmission uses chain and sprocket to transmit power

a) Clutch, gearbox and live axle transmission,
b) Clutch, gearbox and dead axle transmission,
c) Clutch, gearbox and axle less transmission,
d) All of these

31. Which of the following is true?

a) high torque is required at the start of the vehicle,
b) low torque is required at high speeds
c) gearbox helps in smooth running of vehicle,
d) All of these

32. Which of the following is not a type of gearbox?

a) Linear mesh gearbox
b) Sliding mesh gearbox
c) Synchromesh gearbox
d) Epicyclical gearbox

33. Which of the following gear boxes have lesser mechanical efficiency?

a) Constant-mesh gearbox **b) Sliding mesh gearbox**
c) Synchromesh gearbox d) Epicyclical gearbox

34. The percentage ratio between difference of vehicle speed and wheel speed to the vehicle speed is

a) Velocity ratio **b) Slip ratio**
c) Speed ratio d) Aspect ratio

35. Choose correct drive transmission from engine to gear box

a) Fly wheel - cover - drive plate - driven plate
b) Fly wheel - cover - driven plate - drive plate
c) Fly wheel - driven plate - drive plate -cover
d) Fly wheel - drive plate - driven plate – cover

36. As related to the automatic transmission, the friction loss in the manual transmission is

a) Same **b) Less**
c) More d) Much more

37._____ is used to ensure that the main shaft and main speed gear to be Locked to it are rotating at the same speed.

a) Transfer Case **b)** Transaxle
c) Shift fork d) **Synchronizer**

38. Cluster gear is other name for _____

a) Idler Gear **b) Countershaft Gear**
c) Main Shaft gear d) Final Drive

39. _____ are commonly used on Front wheel drive vehicles

a) Transaxles **b)** Double Reductions
c) Synchronizers d) Slip Joints

40. The purpose of gear box in motor vehicle is/are

a) To get the various speed b) to get the various torque
c) both of these d) none of these

41. Increase of torque in a vehicle is obtained by

a) decreasing speed b) decreasing power
c) decreasing petrol consumption d) all the above

42. Two advantages of using helical gears rather than spur gears in a transmission are

a) high strength and low cost
b) low noise level and high strength
c) high strength and less end thrust
d) low noise level and economy

3. Automobile Control Systems

(Total Marks = 10)

Position in Question Paper **Total Marks-10**

Q.1. d) 2-Marks.
Q.3. c) 4-Marks.
Q.3. a)4 -Marks.

Descriptive Question

1. State requirements of good steering system and the need of steering system.
2. Explain various steering systems.
3. With neat sketch, explain working of rack and pinion type steering gear.
4. With neat sketch, explain working of recirculating ball type steering gear.
5. Explain working of power steering of any one type with neat diagram.
6. Define and state its effects and its normal range. a) King pin inclination b)Camber angle c) Castor d) Combine Angle e) Toe in & Toe out
7. Give the classification of brakes and braking systems.
8. Explain with neat figures a) Mechanical Drum brake b) Disc Brake
9. Differentiate between disc brake and drum brake.
10. Explain hydraulic braking system with neat sketch.
11. Compare between hydraulic braking systems with pneumatic braking system.
12. Draw neat labeled sketch and explain working of a) Master Cylinder b) Tandem Master Cylinder c) Wheel Cylinder
13. Describe pneumatic breaking system with neat sketch and state advantages.

MCQ Question

(Total number of Question=Marks*3=10*3=30)

Note: Correct answer is marked with **bold**

1. In a vehicle the problem cause for hard steering could be
   a) Low tyre pressure
   b) Bent wheel spindle
   c) Tie rod end tight
   d) **Any of these**
2. The angle of camber is usually
   a) Less than $½^0$
   b) Between $½^0$ and 2^0
   c) 2^0 to 5^0
   d) 5^0 to 7^0
3. The king pin inclination is usually
   a) Less than $½^0$
   b) Between $½^0$ and 2^0
   c) 2^0 to 5^0
   d) 5^0 to 7^0
4. The distance between centre of front wheel is called
   a) Track
   b) Wheel base
   c) Axle width
   d) Turning circle
5. A certain steering has a track rod which is equal in length to the distance between the swivel axis centres, when the outer wheel is steered through 20 the angle steered by the inner wheel is
   a) Less than 20^0
   b) 20^0
   c) More than 20^0 but less than 25^0
   d) More than 25^0
6. When a vehicle cornering , each wheel should form a right angle to a line draw from the
   a) Center line of the vehicle
   b) Instantaneous centre of rotation
   c) Center of rear axle
   d) Mid-point of the front suspension system
7. As applied to steering , the abbreviation P.A.S. Stands for
   a) Pump assisted system
   b) Pump aided steering
   c) Power activated system
   d) **Power assisted steering**
8. A collapsible steering column is one which collapses to
   a) Damp out road vibration
   b) Improve safety for the driver
   c) Power Simplify its removal for repair
   d) Provide adjustment for the steering wheel

9. Rotary motion of the steering is converted to a reciprocating motion by

a) Track arm
b) Track rod
c) Stub axel
d) **Steering box**

10. The track rod is connected to the track arm by a

a) Ball Joint
b) King pin
c) Stub axel
d) Universal joint

11. Front wheel alignment is adjusted by altering the

a) Angel of track arm
b) Length of track arm
c) Distance between kingpins
d) Position of the drag link

12. Angel of track arm B : Length of track arm C : Distance between kingpins D : Position of the drag link

a) Ball Joint
b) King pin
c) Stub axel
d) Universal joint

13. Which one is not steering gear

a) Recirculating ball steering gear
b) Reciprocating ball steering gear
c) Cam and roller steering gear
d) Worm and sector steering gear

14. Which part of electronic power steering reverts back to manual steering in case of failure in power steering?

a) Solenoid valve
b) Phase compensator
c) Fail Safe relay
d) Current controller

15. Which device in electronic power steering converts the steering torque input and its direction in to voltage signals?

a) Rotation sensor
b) Torque sensor
c) Hall effect sensor
d) Temperature sensor

16. What is the advantage of electronic power steering?

a) Compact in size
b) Energy being consumed only while steering
c) Less occupation of space
d) Number of components are less

17. Which steering system will provide assistance even when the engine is not running?

a) Integral power steering
b) Linkage power steering
c) Electronic power steering
d) Manual steering

18. Which part of integral power steering reduces fluid pressure?

a) Torsion bar
b) Rotary valve
c) Unloading valve
d) Flow control valve

19. What is the role of recirculating balls in the integral power steering?
- **a)** Affect steering stability
- **b)** Prevent control in event of hydraulic failure
- **c)** **Combine high mechanical efficiency with smooth operation**
- d) Provide hard steering

20. Which is the heart of integral power steering system?
- **a)** Flow control valve
- **b)** **Rotary valve**
- **c)** Pressure relief valve
- d) Unloading valves

21. Which is not the benefit of power steering?
- **a)** Effortless driving
- b) Quick response
- **c)** Absolute control during driving
- d) **Positive breaking system**

22. Why light weight cars use low steering ratio?
- **a)** To obtain low steering effect
- **b)** **To obtain large steering effect**
- **c)** To obtain constant steering effect
- d) To obtain no steering effect

23. Which angle helps in self-centring of wheels after negotiating a turn?
- **a)** Castor angle
- **b)** **King pin inclination**
- **c)** Camber angle
- d) Included angle

24. What is the purpose of castor in wheel alignment?
- **a)** **Maintain directional stability and control**
- **b)** Reduce tyre wear
- c) Reduce abnormal vibration
- d) Convert steering torque input into voltage signal

25. How to rectify the defect of noise in hydraulic steering?
- **a)** Replace with new fluid
- **b)** **Fill fluid to correct level and bleed the system**
- c) Adjust the torsion bar linkage
- d) Replace the flow control valve

26. What is the cause of noise in steering?
- **a)** High fluid level
- **b)** **Presence of air in the fluid**
- **c)** Defective flow control valve
- d) Defective torsion bar

27. What will be effect of unequal castor in the vehicle?
- **a)** **Vehicle pull to one side wheel**
- **b)** Vehicle will not move
- c) Driver have to use less effort on steering
- d) Increase steering stability

28. What is the reason of steering wheel play excess?
- **a)** **Improper pre load defective steering**
- **b)** Low oil level
- **c)** Drop in pressure
- d) Worn out sealing rings

29. What is the cause of "Wheel wobbling"?

a) **Improper tyre pressure** **b)** King pin worn out
c) Drop in pressure d) Wrong hose size

30. Why tyre wear found abnormal in the vehicle?

a) Loose wheel nut
b) Improper tyre pressure
c) **Improper linkage adjustment**
d) Improper toe-in and toe – out

31. What causes the defect of 'Hard steering in the hydraulic power steering system?

a) Improper position of drop arm **b)** Tie rod loose fitting
c) **Band axle beam** d) Improper size of tyre

32. What causes "Air suction" in pump of hydraulic power steering system?

a) **Noise** **b)** High fluid level
c) Low pressure d) Steering wheel play

33. What is the cause of "low pressure" in the hydraulic power steering system?

a) Low oil level **b)** **Wrong flow control valve setting**
c) Air in the system d) Worn-out sealing ring

34. Effort required to the steer the vehicle should be

a) Maximum **b)** **Minimum**
c) Zero d) All of these

35. Effort required to steer must not be _____to the driver

a) **Tiresome** **b)** Easy
c) Difficult d) All of these

36. Which one is not a part of steering gear layout _____.

a) Steering wheel **b)** Steering column
c) Steering gear d) **Crank shaft**

4. Suspension System and Wheels and Tyres

(Total Marks = 12)

Position in Question Paper **Total Marks-12**

Q.3. a) 4-Marks.
Q.3. d) 4-Marks.
Q.4. a) 6-Marks.

Descriptive Question

1. How air suspension system works? Draw the layout.
2. Draw neat sketch of leaf spring. State its function.
3. Describe conventional tube tyre and tubeless tyre with neat sketch.
4. Explain wheel alignment and wheel balancing.
5. Explain the types of Wheel Rims.
6. Explain the working of telescopic shock absorber with neat sketch.
7. Explain need of suspension system in automobiles.
8. Compare tubed tyres with tubeless tyres.
9. Describe with neat sketch the effect of – under inflation over inflation on tyre.
10. Describe construction of Macpherson suspension system with neat sketch.
11. Explain construction and working of Wishbone type suspension system with neat sketch.
12. Explain Tyre properties and tyre identification.

MCQ Question

(Total number of Question=Marks*3=12*3=36)

Note: Correct answer is marked with **bold**

1. Which type of suspension spring cannot transfer wheel guidance forces?
   a) Helical springs b) Coil springs
   c) Leaf springs d) Compression springs
2. What is the advantage of coil spring?
   a) Good load carrying capacity b) High steering and stability
   c) Low space requirement d) Provide greater pay load
3. Which type of suspension spring made of fibre glass, laminated and bonded together by tough polyester resins?
   a) Coil springs b) Multiple leaf springs
   c) Monoleaf springs d) **Fiber composite springs**
4. Which type of spring will have good load carrying capacity and do not have noise in the suspension system?
   a) Coil springs **b) Multiple leaf springs**
   c) Monoleaf springs d) Fiber composite springs
5. Which system provided between axles and chassis frame?
   a) Braking system **b) Suspension system**
   c) Steering system d) Cooling system
6. Which is not the function of suspension system?
   a) It maintains body level
   b) It gives cushioning effects
   c) It transfer braking torque to the chassis
   d) It increase steering stability
7. Which type of independent suspension system simple in construction and allow more deflection of the front wheel without effect on the steering?
   a) Torsion bar suspension **b) Strut type suspension**
   c) Coil spring suspension d) Conventional suspension
8. Which part of coil spring allows angular movement of linkages?
   a) Ball joint **b)** Stabilizer bar
   c) Torsion bar d) Lower control arm

9. Which type of spring suspension responds quickly to road shocks?
- **a)** Compression spring
- **b) Coil spring**
- **c)** Helical spring
- d) Transverse spring

10. Which type of shock absorber maintain vehicle ride at a pre - set level according to the load placed over the rear axle?
- **a)** Gas pressurized shock absorber
- **b)** Hydraulic shock absorber
- **c) Automatic load adjustable shock absorber**
- d) Mechanical shock absorber

11. What is the effect of weak suspension?
- **a)** Directional instability of vehicle
- **b)** Carrying excessive payload of vehicle
- **c)** Unequal weight distribution of weight
- **d) Vibration damping is more effective**

12. Which type of shock absorber is easy for replacement and handling?
- **a)** Vane type
- **b)** Piston type
- **c)** Mechanical type
- d) **Telescopic type**

13. Which type of shock absorber absorbs shocks with the help of friction disc and spring?
- **a)** Hydraulic type
- **b)** Electrical type
- **c) Mechanical type**
- d) Pneumatic type

14. Which device in the air suspension system observes vibration of low amplitude and high frequency?
- **a) Shock absorber**
- **b)** Suspension spring
- **c)** Air bags in the system
- d) Leaf spring

15. Where the airbags are located in the air suspension system?
- **a) Between frame and vehicle axle**
- **b)** Between high control valve and frame
- **c)** Between air pressure regulator and front axle
- **d)** Between brake tank and vehicle axle

16. What is the purpose of air suspension?
- **a)** Used for leveling purpose
- **b)** Reduce the suspension weight
- **c) Increase the directional stability**
- d) Reduce the space occupation

17. Why vibration damper are not used inside the helical spring?
- **a)** Possibility of stuck in one position
- **b) Not economical**
- **c)** Fitting and removing time consuming
- d) No effect on load carrying capacity

18. Why rubber buffer is provided in the main spring of suspension system?

a) Transfer pay load smoothly
b) Protect chassis frame from heavy jerk
c) Transfer the load equally
d) Provide steering control stability

19. Which factor affecting suspension

a) Damaged chassis frame
b) Worn out spring
c) More shocks, uncomfortable riding
d) Abnormal tyre wear

20. Why suspension is used in motor vehicle

a) To reduce the noise
b) To reduce the vibrations
c) To control the speed
d) **All of above**

21. What is the advantage of using nitrogen in the tyres?

a) Provide positive road grip
b) Increase the tyre life
c) Provide cushioning effect on the vehicle
d) Observe shocks and vibration

22. What is the use of compact spare tyres

a) Used for breakdown
b) Used for high altitude
c) Withstand heavy load
d) Withstand high temperature

23. Which rating indicate the braking capabilities of the tire to the consumer?

a) Ply rating
b) Tyre rating
c) Traction rating
d) Temperature rating

24. What is the advantage of using run flat tyres?

a) Less cost and maintenance
b) Eliminate head for spare tyre and jack
c) Resist vibration
d) Provide equal distribution of load

25. What will effect in case of over inflated tyres?

a) Tyre will wear out at centre
b) Tyre will wear out at edges
c) Tyre will crack at edges
d) Tyre will crack at centre

26. What is the purpose of beads and plys provided in the tyre?

a) Provide strength to tyre
b) Provides balancing of vehicle
c) Holds the tyre in correct position
d) Distribute the load equally

27. What is the function of Rim in the wheel construction?
- **a)** Support the axle
- **b)** Provides balancing of vehicle
- **c)** **Holds the tyre in correct position**
- d) Distribute the load equally

28. What is the purpose of spokes provided in the wheel?
- **a)** **Provide accurate rounds of rim**
- **b)** Distribute pre load evenly
- **c)** Provide directional stability of vehicle
- d) Support the chassis frame of vehicle

29. What is the impact of larger scrub radius?
- **a)** Wear on the outer edge of tyre
- **b)** **Unequal braking on the front wheel**
- **c)** Wear on the centre part of tyre
- d) Bending of steering linkage point

30. What will be the effect of negative scrub radius?
- **a)** Wheel is caused to toe - out
- **b)** Wheel is kept in straight position
- **c)** The tyre centre portion wear out
- **d)** **Wheel is caused to toe – in**

31. What causes abnormal tyre wear, tyre slip and poor steering stability?
- **a)** **Incorrect toe - in and toe – out**
- **b)** Malfunctioning of torsion bar
- **c)** Presence of air in the brake fluid
- **d)** Front axle bend/twist

32. What is the main cause for wear on one side of tyre?
- **a)** **Improper camber**
- **b)** Improper caster
- **c)** Over inflation
- d) Under inflation

33. What is the reason of faster wear out of tyre edges?
- **a)** **Under inflated tyre**
- **b)** Over inflated tyre
- **c)** Un equal load distribution
- **d)** Defective suspension system

34. Why the alternator spokes are screwed to slope forward and backward towards the rim in the wire wheel?
- **a)** To take the uneven load
- **b)** To provide cushioning effect
- **c)** **To observe braking and driving torque**
- d) To distribute the load evenly

35. What is the cause of "Poor self centering" in a vehicle?

a) Filter chocked
b) Improper wheel alignment
c) Tyre will crack at edges
d) Tyre will crack at centre

36. The Number of plies in a truck tyre is usually

a) 2
b) 3
c) 5-8
d) **12-16**

5. Electrical and Electronic Components

(Total Marks = 14)

Position in Question Paper **Total Marks-14**

Q.1. e) 2-Marks.
Q.4. c) -6Marks.
Q.5. a) 6-Marks.

Descriptive Question

1. Explain the working of electronic ignition system.
2. Explain the construction and working of lead-acid battery with neat sketch.
3. Write different colour codes used in automobile wiring system.
4. Explain the working of bendix drive with neat sketch.
5. State the need of charging system. Explain construction and operation of charging system used in automobiles.
6. Describe wire harness. State any four colour codes used in wiring system of automobiles.
7. Explain battery ignition system with neat sketch.
8. Explain construction and working of alternator with neat sketch.
9. Explain battery capacity and rating.
10. Describe wire harness. State any four colour codes used in wiring system of automobiles.
11. List the main components of battery.
12. Compare Battery and Magneto Ignition system.
13. List four basic electrical – electronics components used in automobiles.

MCQ Question

(Total number of Question=Marks*3=14*3=42)

Note: Correct answer is marked with **bold**

1. Which type of draft is most commonly used in automobile carburettor?
   - **a) Down draft**
   - **b)** Updraft
   - **c)** Horizontal draft
   - d) Inclined draft
2. One of the function of induction manifold in an engine is to
   - **a)** Atomize the fuel
   - **b) Vaporize the fuel**
   - **c)** Meter the fuel
   - d) Regulate the fuel
3. The petrol filter is connected to a fuel pipe
   - **a)** The petrol filter is connected to a fuel pipe
   - **b) Between petrol tank and fuel pump**
   - c) Between carburetor and cylinder
   - d) Between carburetor and crankcase
4. The circuit in the carburetor is responsible for maintaining a constant level reservoir of fuel is called the
   - **a)** Fuel circuit
   - **b) Float circuit**
   - **c)** Level circuit
   - d) Choke circuit
5. Under which condition is choke is closed?
   - **a)** When the engine is idling
   - **b)** When the engine is running at high speed
   - c) When the engine is to be suddenly accelerate
   - **d) When the engine is cold is to be started**
6. The element of fuel filter is made of
   - **a)** Porous cast iron
   - **b)** Aluminium
   - **c)** Brass
   - d) **Pleated paper**
7. Which one of the following reasons can richen the air/fuel mixture for cold starting ?
   - **a)** Fuel particles are smaller
   - **b)** Quantity of air is less
   - **c) Cold engine doesn't vaporized**
   - d) Cold fuel will not flow through the jet
8. Which one of the following methods is used on constant volume carburetor supply a suitable mixture for cold start
   - **a) The jet is lowered**
   - **b)** The needle is lowered
   - **c)** The strangler is closed
   - d) The flap on air intake is close
9. A compensation system is incorporated in modern fixed choke carburetor . it prevents
   - **a)** Flooding at high speed
   - **b) Richness at high speed**
   - **c)** Weakness at high speed
   - d) Starvation at high speed

10. The flow of petrol from a constant volume carburetor is increased when the engine load is increased by
- **a)** Altering the petrol level
- **b)** Intensifying the choke depression
- c) Speeding up the air flow over the jet
- **d) Causing the piston to raise the tapered needle**

11. Who discovered that a magnetic field exist around a current carrying conductor?
- **a)** Michael farad
- **b)** Stephen volta
- **c) Oersted**
- d) Thomas alva edison

12. Faraday's law are followed by ----------
- **a) Generator**
- **b)** Television
- **c)** Heater
- d) None of these

13. The Len'z law is applicable to ----------
- **a)** A.C generator
- **b)** D.C generator
- **c)** Both A&B
- d) Electro magnetic

14. The spark is produced by ----------
- **a)** The battery
- **b)** Electrodes
- **c) The spark plug**
- d) None of these

15. The spark must produce spark at the correct movement , i.e ----------
- **a)** At the beginning of the compression stroke
- **b) At the end of the compression stroke**
- c) At the end of power stroke
- **d)** None of these

16. The spark plug for all driving condition must be
- **a)** High heat resistance
- **b)** High pressure resistance
- **c)** Corrosion resistance
- d) **All of these**

17. Engine misfiring is likely to result from ----------
- **a)** Spark plug gap too small
- **b) Spark plug gap too wide**
- **c)** Vapour lock in the fuel only
- d) Incorrect fuel air mixture

18.A hot spark plug has ----------
- **a)** Shorter path of heat travel
- **b) Longer path of heat travel**
- **c)** No path of heat travel
- d) None of these

19. The cold spark plug which has ----------
- **a)** Longer path travel and runs cooler
- **b)** No path of heat travel and runs cooler
- **c) Shorter path of heat travel and runs cooler**
- d) None of these

20.A spark plug will fall in its function due to the ----------
- **a)** Plug fouled by engine oil entering the combustion chamber
- **b)** Plug fouled by too rich mixture
- **c)** Spark plug gap is incorrect
- **d) All of these**

21. What is the material used to make diodes?
- **a)** Mica
- **b) Silicon**
- **c)** Alumina foil
- d) Graphite

22. What is the function of over running clutch in the starting system?
- **a) Protect armature from damage**
- **b)** Prevent sliding movement of pinion
- **c)** Operate the solenoid
- **d)** Drive the armature shaft

23. How the alternator field terminal is connected to the battery?
- **a) By ignition switch**
- **b)** By indicator lamp
- **c)** By charge indicator
- d) By voltage regulator

24. What is the function of solenoid switch?
- **a)** Open and close the circuit between primary and secondary
- **b)** Step down voltage from primary to secondary
- **c) Close the contact between battery and starting motor**
- **d)** Shift the lever to engage the plunger

25. What is the function of rotor assembly?
- **a)** Supports pre lubricated scaled bearing
- **b) Carriers driving pulley and cooling fan**
- **c)** Allow the current flow in one direction
- **d)** Supports rectifier mounting plates

26. Which type of winding is connected to the starter switch in the solenoid switch?
- **a) Pull in winding**
- **b)** Hold in winding
- **c)** Compound winding
- d) Primary winding

27. What is the minimum RPM of crank shaft required to start the engine?
- **a)** 180 RPM
- **b)** 200 RPM
- **c) 100 RPM**
- d) 150 RPM

28. Where the starter motor located?
- **a)** Front side of engine
- **b) Rear side of engine**
- **c)** Top side of engine
- d) Bottom of engine

29. What is the function of diodes?
- **a) Convert AC to DC**
- **b)** Convert DC to AC
- **c)** Step up voltage
- d) Step down voltage

30. What is the colour of pilot lamp provided in the vehicle?
- **a)** Red
- **b) Green**
- **c)** White
- d) Orange

31. What is the colour of front indicator lamps?
- **a)** Red
- **b) Green**
- **c)** White
- d) Orange

32. What is the type of head light?
- **a)** Sealed beam head light
- **b) Halogen head light**
- **c)** LED head light
- **d)** Double filament head light

33. What is the expansion of LED?
- **a)** Long electrical diodes
- **b)** Light electronic diodes
- **c) Light emitting diodes**
- **d)** Limited electrical data

34. What is the gas filled in the sealed beam head lights?
- **a)** Oxygen gas
- **b)** Nitrogen gas
- **c) Argon gas**
- d) Hydrogen gas

35. Where the red colour indicator lamps are provided in the vehicle?
- **a)** Front side
- **b)** Pilot lamp
- **c)** Side of vehicle
- d) **Rear side**

36. What is the advantage of using side indicator in a vehicle?
- **a) Prevent accident while turning left and right**
- **b)** Provide effective illumination
- **c)** Indicate the vehicle behind
- **d)** Provide enough visibility

37. What is the use of cornering light in a vehicle?
- **a)** Provide interior illumination
- **b) Highlight the blind spot during bend**
- **c)** Indicate traffic behind vehicle
- **d)** Provide enough visibility to driver

38. What is the advantage of multiplex network?
- **a)** Improve vehicle safety system
- **b)** Prevent malfunctioning of air bag system
- **c)** Reduce system cost and weight
- **d) Determine vehicle tracking system**

39. Which system determines the vehicles location by forming a triangle with a group of four or more satellites?
- **a) Triangulation**
- **b)** Telemetric
- **c)** Reflective displays
- d) Networking and Multiplexing

40. Which sensor used for safer parking of vehicle?

a) Infrared sensor **b)** Crash sensor

c) Proximity sensor d) Air bag sensor

41. What is the purpose of seat belt pre Pensioner?

a) Hold the occupant tightly in the seat

b) Detect passengers' weight

c) Prevent the side way movement of seat

d) Protect the occupant from head injury

42. How to confirm the satisfactory function of air bag system?

a) Air bag warming light come on during starting and stopping

b) Warming light on with engine running through

c) Warning light on and flash few times and go

d) Peep sound on during starting

6. Motor Vehicle Act, Road Safety and Garage Practices

(Total Marks = 10)

Position in Question Paper **Total Marks-10**

Q.3. a) -4Marks.
Q.5. b) 6-Marks.

Descriptive Question

1. Define HGV and LGV
2. Describe collapsible steering column with neat sketch.
3. Draw a neat sketch of i. Informatory Symbols ii. Cautionary Symbols iii. Mandatory Symbols
4. Draw labelled layout of a modern service station use in automobile workshop.
5. Define Transport term: 1) Driver 2) Passenger.
6. Explain any four records to be kept in service station.
7. Describe duties and responsibilities of RTO.
8. Draw neat sketch of Fuel gauge

MCQ Question

(Total number of Question=Marks*3=10*3=30)

Note: Correct answer is marked with **bold**

1. When motor vehicle act came into force?
   a) 1 July 1989 **b)** 1 Aug 1985
   c) 31 Aug 1968 d) 1 July 1988
2. How to define a vehicle constructed to carry more than 6 passengers but not more than 12 passengers?
   a) Light motor vehicle **b)** Goods carriage
   c) Maxi cab d) Contract carriage

3. What is the age limit prescribed to drive transport vehicles?
- **a)** 16 Years
- **b)** **20 Years**
- **c)** 18 Years
- d) 22 years

4. What is the validity of learner driving license?
- **a)** **6 Months**
- **b)** 10 Months
- **c)** 8 Months
- d) 1 year

5. What is the validity period of the license to drive non transport vehicle?
- **a)** 10 Year
- **b)** **20 Years**
- **c)** 15 Years
- d) 22 Years

6. What is the validity for international driving license?
- **a)** 2 Years
- **b)** **1 Years**
- **c)** 3 Years
- d) 5 Years

7. What is the overall length of a transport vehicle with rigid frame with two or more axles permitted by motor vehicle rules?
- **a)** 8 Mtrs
- **b)** 6 Mtrs
- **c)** **12 Mtrs**
- d) 15 Mtrs

8. Which form is used for declaration of physical fitness in the motor vehicle act?
- **a)** **Form 1**
- **b)** Form 9
- **c)** Form 1A
- d) Form 20

9. What is the use of form LLD in motor vehicle act?
- **a)** No objection certificate
- **b)** Registration of motor vehicle
- **c)** **Intimation of loss driving license**
- d) Medical certificate

10. What is the permitted overall height of tractor trailer goods vehicle as per motor vehicle act?
- **a)** **Not to exceed 4.20 Mtrs**
- **b)** Not to exceed 4.50 Mtrs
- **c)** Not to exceed 4.75 Mtrs
- d) Not to exceed 4.00 Mtrs

11. What is the permitted overall height of tractor trailer goods vehicle as per motor vehicle act?
- **a)** **Not to exceed 4.20 Mtrs**
- **b)** Not to exceed 4.50 Mtrs
- **c)** Not to exceed 4.75 Mtrs
- d) Not to exceed 4.00 Mtrs

12. What is the purpose of form 33 used regarding registration certificate?
- **a)** Notice of transfer of owner ship or vehicle
- **b)** Renewable of certificate of fitness
- **c)** **Intimation of change of address**
- d) Registration of motor vehicle act

13. Which form is required to obtain temporary authorization of use of vehicle when the certificate of fitness expired?

a) Form C.F Sub **b)** Form C.F.A
c) Form C.F.R.A d) Form C.F.A.B

14. Why form- 9 is required for driving license in motor vehicle act?

a) To intimate loss to driving license
b) For renewal of driving license
c) To declare physical fitness
d) For no objection certificate

15. Which among the following form is required for driving license?

a) Form 20 **b)** Form CFA
c) Form 30 **d) Form LLD**

16. What is the cause of erratic running of engine?

a) Defective radiator pressure cap
b) Water present in the fuel
c) Low compression pressure
d) Clogged air cleaner

17. What causes high oil pressure?

a) Defective oil pump **b) Defective relief valve**
c) Water present in the fuel d) Defective fuel feed pump

18. What is the result of more carbon deposit on the piston head?

a) Engine over heating **b)** Low power generation
c) High fuel consumption **d) Engine noise**

19. What is the effect on engine performance if the low viscosity grade oil used?

a) High fuel consumption **b) Excessive oil consumption**
c) Less Oil consumption **d)** Engine will be over heated

20. What will be the effect of clogged fuel tank vent hole?

a) Engine does not start **b)** High oil consumption
c) High fuel consumption **d)** Engine over heating

21. What will be the probable reason of low oil pressure?

a) Worn-out camshaft, crank shaft bearings.
b) Defective injector
c) More crankshaft end play
d) Carbon deposit on piston head

22. What is the result of clogged oil strainer in the sump?

a) High oil pressure **b)** Low fuel pressure
c) Low oil pressure d) High oil consumption

23. What will be the result of improper injection timing?

a) Low power generation **b)** **Engine does not start**
c) High fuel consumption d) High oil consumption

24. What is the outcome of starting engine with corroded battery terminals?

a) Engine run erratically **b)** **Engine will not start**
c) Low power generation d) Engine will be over heated

25. What will be the effect on the engine performance in case of loose fan belt?

a) **Engine over heating** **b)** High full consumption
c) Low power generation d) High fuel pressure

26. What will be effect on engine performance in case of air in the fuel system?

a) High fuel consumption **b)** High oil consumption
c) **Engine runs erratically** d) Low fuel consumption

27. How many spark plugs are ignited at the same time in the distributor less ignition system?

a) **Two** **b)** Four
c) Three d) Five

28. What is the function of distributor in the battery ignition system?

a) Distribute high tension current from ignition coil to secondary winding
b) **Distribute high tension current flow ignition coil to spark plugs**
c) Opens and closes the secondary circuit of coil
d) Distribute low tension current to ignition coil

29. What is the purpose of condenser in the ignition system?

a) Distribute high tension current to spark plugs
b) Insulate spark plug electrodes
c) **Prevents arcs at the points**
d) Open and close the primary circuit

30. What achieve through spark plug end gap design?

a) **Improve combustion swirl**
b) Increase the fuel pressure
c) Improve fuel atomization
d) Helps for the complete ignition