

# MIZORAM PUBLIC SERVICE COMMISSION

## TECHNICAL COMPETITIVE EXAMINATIONS FOR RECRUITMENT TO THE POST OF MOTOR VEHICLE INSPECTOR UNDER GOVERNMENT OF MIZORAM JANUARY, 2014

### AUTOMOBILE ENGINEERING PAPER – I

Time Allowed : 2 hours

Full Marks : 150

*All questions carry equal marks of 2 each.*

*Attempt all questions.*

1. The word vehiculum (vehicle) is derived from:  
(a) Greek (b) Latin  
(c) Spanish (d) Roman
2. An Automobile is:  
(a) a self propelled vehicle which is used for transportation of goods and passengers on the ground  
(b) a machine used for transportation  
(c) that in which power required for the propulsion is produced from within  
(d) a name for the self propelled vehicle running on the ground
3. The basic automobile structure consists of the suspension system, wheels, frame and:  
(a) lights (b) axles  
(c) steering (d) brakes
4. Most commonly used power plant on automobiles is:  
(a) Gas turbine (b) Battery  
(c) I.C. Engine (d) Solar
5. A construction of vehicle body and its underlying structures into a single load bearing unit is called monocoque (simple shell). Monocoque is a word from:  
(a) French (b) Latin  
(c) Spanish (d) Hebrew
6. The first pneumatic tyre was made by John Boyd Dunlop (Scotland) in the year:  
(a) 1900 (b) 1880  
(c) 1888 (d) 1901
7. The location of Nano car engine is in the:  
(a) Front (b) Middle  
(c) Rear (d) None of these
8. The fuel called CNG used in automobiles stands for  
(a) Compound Natural Gas (b) Compound Nature Gasoline  
(c) Compound Nature Gas (d) Compressed Natural Gas

9. Your car fuel tank was empty and you refilled it with 40 lits. of petrol, you drove for 450 kms. and petrol was exhausted. So, your car fuel consumption in terms of kpl (kilometer/litre) is
- (a) 10.5 (b) 9  
(c) 12 (d) 11.25
10. The engine displacement of Maruti Gypsy is
- (a) 1200 c.c. (b) 1500 c.c.  
(c) 1290 c.c. (d) 1298 c.c.
11. The diesel engines are also known as
- (a) steam engine (b) spark ignition  
(c) compression engine (d) none of these
12. In diesel engines, the duration between the time of injection and the time of ignition is called
- (a) spill cut off (b) delay period  
(c) injection period (d) ignition period
13. In an engine, the temperature of the piston will be more at the
- (a) skirt of the piston (b) crown of the piston  
(c) piston walls (d) piston slots
14. In diesel engines, during suction stroke, \_\_\_\_\_ is drawn in the cylinder.
- (a) air and fuel (b) only fuel  
(c) only air (d) none of these
15. The advantage of the fuel injection system over the carburettor system is
- (a) improved fuel efficiency (b) improved emission  
(c) improved power output (d) none of these
16. The diesel engines as compared to petrol engines require
- (a) bigger flywheel (b) smaller flywheel  
(c) same size of flywheel (d) no flywheel
17. The materials used for cylinder block are
- (a) cast iron and aluminium alloy (b) cast iron and steel  
(c) steel and aluminium alloy (d) brass and steel
18. The Ignition in a spark ignition engine takes place when the piston is
- (a) exactly at the T.D.C position on its compression stroke  
(b) approaching the T.D.C position in its compression stroke  
(c) leaving the T.D.C position on its compression stroke  
(d) approaching the T.D.C position on its exhaust stroke
19. The sequence order of events in a four-stroke engine is
- (a) suction - exhaust - power - compression (b) suction - power - compression - exhaust  
(c) suction - compression - power - exhaust (d) exhaust - compression - power - suction
20. The camshaft is driven by the crankshaft via the timing belt
- (a) correct (b) incorrect  
(c) gear pinion (d) none of these

21. Piston displacement of a vehicle is expressed as  
(a) cubic capacity (b) cubic centimetres  
(c) compression capacity (d) centrifugal capacity
22. Catalytic converters  
(a) reduce consumption of fuel (b) reduce emission into less harmful gases  
(c) reduce consumption of engine oil (d) reduce consumption of diesel
23. The size of engine cylinder is referred in terms of its  
(a) diameter and bore (b) displacement and efficiency  
(c) bore and stroke (d) bore and length
24. Valve overlap is the number of degrees of camshaft rotation during which  
(a) both valves are closed (b) both valves are open  
(c) both (a) and (b) (d) none of these
25. The cycle of four stroke petrol engine is completed on:  
(a) four revolutions of crankshaft (b) three revolutions of crankshaft  
(c) two revolutions of crankshaft (d) none of these
26. Four stroke petrol engines are also called:  
(a) S.I Engines (b) C.I Engines  
(c) Hybrid Engines (d) None of these
27. Compression ratio can be defined as:  
(a)  $\frac{\text{Clearance Volume} + \text{Displacement Volume}}{\text{Clearance Volume}}$   
(b)  $\frac{\text{Displacement Volume} - \text{Clearance Volume}}{\text{Displacement Volume}}$   
(c)  $\frac{\text{Clearance Volume} + \text{Clearance Volume}}{\text{Displacement Volume}}$   
(d) None of these
28. Two stroke engine has higher mechanical efficiency than four stroke engine:  
(a) Because of its simple design  
(b) As it consumes more lubricating oil  
(c) Due to the absence of cams, crankshafts and rockers of the valves  
(d) None of these
29. The Diesel Engine is known as:  
(a) Constant-Volume Engine (b) Constant-Pressure Engine  
(c) Constant-Volume-Pressure Engine (d) None of these
30. Common Rail Direct Injection (CRDI) system is used in:  
(a) Petrol Engine (b) Diesel Engine  
(c) Steam Engine (d) Both (a) and (b)
31. One horse power (hp) equals to:  
(a) 1 kW (b) 0.500 kW  
(c) 0.750 kW (d) 0.746 kW

32. The engine bore is:
- (a) length of piston
  - (b) outside diameter of cylinder
  - (c) top of the piston
  - (d) inside diameter of cylinder
33. The device for smoothening out the power impulses from the engine is called
- (a) clutch
  - (b) differential
  - (c) flywheel
  - (d) torque converter
34. The ball joints are used on the tie-rod ends, because they
- (a) reduce the amount of noise generated
  - (b) reduce the amount of sliding resistance
  - (c) can deal with movement of the suspension both vertically and in other direction
  - (d) improve the force transmission speed
35. The correct flow of power through the drive train is
- (a) engine - drive shaft - clutch - main shaft - countershaft - final driven gear - wheels
  - (b) engine - clutch - main shaft - countershaft - final driven gear - drive shaft - wheels
  - (c) engine - clutch - countershaft - main shaft - final driven gear - drive shaft - wheels
  - (d) engine - main shaft - countershaft - clutch - final driven gear - drive shaft - wheels
36. Two advantages of using helical gears rather than spur gears in a transmission system are
- (a) strength and cost
  - (b) strength and less end thrust
  - (c) noise level and strength
  - (d) noise level and economy
37. In a single dry plate clutch, torsional vibration are absorbed by
- (a) coil springs known as torsional springs
  - (b) cushion springs
  - (c) central hub
  - (d) clutch pedal
38. In a four wheel drive (4WD), the number of gear boxes is
- (a) 1
  - (b) 2
  - (c) 3
  - (d) 4
39. The clutch is located between the transmission and the
- (a) engine
  - (b) rear axle
  - (c) propeller shaft
  - (d) differential
40. In a gear box, the reverse gear have
- (a) synchromesh device
  - (b) constant mesh gear
  - (c) sliding mesh gear
  - (d) haring bone gear
41. Modern cars generally use
- (a) multi plate clutch
  - (b) double plate clutch
  - (c) single plate clutch
  - (d) triple plate clutch
42. Modern trucks use an axle of
- (a) full floating axle
  - (b) semi floating axle
  - (c) hot kiss drive axle
  - (d) quarter drive axle
43. Propeller shaft is a
- (a) solid long shaft
  - (b) cylindrical long shaft
  - (c) taper long shaft
  - (d) helical long shaft

44. Indian cars generally use
- (a) conventional gear box
  - (b) semi-automatic gear box
  - (c) fully-automatic gear box
  - (d) epicyclic gear box
45. Crank shaft of vehicle is at
- (a) the top of the engine
  - (b) the middle of the engine
  - (c) the bottom of the engine
  - (d) rear of the engine
46. The purpose of transmission in an automobile is:
- (a) To vary the speed
  - (b) To vary the power
  - (c) To vary the torque at the road wheels
  - (d) None of these
47. The oldest type of manual transmission is:
- (a) Sliding mesh type
  - (b) Constant mesh type
  - (c) Synchromesh type
  - (d) None of these
48. Clutch facings are usually attached to the plate by:
- (a) Steel rivets
  - (b) Brass rivets
  - (c) Aluminium screws
  - (d) Steel screws
49. The function of Universal joints is:
- (a) To allow propeller shaft to change length
  - (b) To allow propeller shaft to bend sideways
  - (c) To allow propeller shaft to transfer torque at an angle
  - (d) None of these
50. The smaller gears inside the differential casing are:
- (a) Ring gears
  - (b) Pinion gears
  - (c) Sun gears
  - (d) Side gears
51. The adjustment for backlash in a differential is provided between:
- (a) Crown wheel and sun gear
  - (b) Sun gear and planet gear
  - (c) Crown wheel and drive pinion
  - (d) Crown wheel and planet gear
52. An example of front wheel drive is:
- (a) Maruti 800
  - (b) Mahindra Bolero
  - (c) Renault Duster
  - (d) None of these
53. Mac Pherson strut type of suspension is used at the
- (a) front suspension
  - (b) rear suspension
  - (c) middle suspension
  - (d) none of these
54. Modern commercial trucks use
- (a) leaf spring suspension
  - (b) bellows type of suspension
  - (c) air assisted suspension
  - (d) coil spring suspension
55. The main function of suspension system is:
- (a) To prevent vehicle from rolling
  - (b) To prevent vehicle from twisting and pitching
  - (c) To prevent from road shocks and to preserve the stability of vehicle
  - (d) None of these

56. The vehicle ride will be comfortable if :
- (a) unsprung weight is kept minimum
  - (b) sprung weight is kept minimum
  - (c) vehicle weight is kept minimum
  - (d) none of these
57. The function of a stabiliser in an automobile is to decrease the tendency to:
- (a) roll
  - (b) pitch
  - (c) yaw
  - (d) dip
58. The function of a shackle with a leaf spring is to:
- (a) allow pivoting of spring end
  - (b) allow spring length to change
  - (c) control sideways
  - (d) control rear torque
59. Shock absorber in an automobile is used to:
- (a) Absorb energy
  - (b) Dissipate energy
  - (c) Release the energy
  - (d) Increase the energy
60. Another name for a damper is:
- (a) Shock absorber
  - (b) Torsional bar
  - (c) Spring
  - (d) None of these
61. Modern shock absorbers are:
- (a) Displacement sensitive
  - (b) Velocity sensitive
  - (c) Acceleration sensitive
  - (d) Force-sensitive
62. Example of unsprung weight of vehicle is:
- (a) leaf spring
  - (b) coil spring
  - (c) gear box
  - (d) front and rear axles
63. Power steering are operated on
- (a) fluid under pressure
  - (b) fluid upper pressure
  - (c) fluid below pressure
  - (d) fluid gear pressure
64. Steering system includes, steering column, steering gears, pitman's arm, drop arm, sector shaft
- (a) correct
  - (b) incorrect
  - (c) except drop arm
  - (d) none of these
65. The angle between the king pin centre line and vertical in a plane of the wheel is called
- (a) castor angle
  - (b) camber angle
  - (c) kingpin angle
  - (d) acute angle
66. Backlash in the steering gear box means
- (a) back pinion in the gear teeth
  - (b) clearance between mated gear teeth
  - (c) clearance between the steering gear and shaft
  - (d) middle gear pinion in the gear teeth
67. The steering system should fulfil the following requirements for the smooth performance:
- (a) It should multiply the turning efforts of the driver and should be irreversible to a certain degree in order to avoid transmission of road shocks to drivers' hand
  - (b) It should be reversible so that the road shocks are not transmitted to the driver's hand
  - (c) It should reduce the efforts of the driver to make driving easy
  - (d) None of these

68. The assembly of the shaft and jacket in a steering system of a vehicle is called:
- (a) Steering box
  - (b) Steering linkages
  - (c) Steering column
  - (d) None of these
69. Ackermann steering mechanism is preferred to Davis steering mechanism due to:
- (a) Its designs
  - (b) Its simplicity
  - (c) Its colour
  - (d) None of these
70. When the slip angle is greater at the rear than at the front, the vehicle tends to:
- (a) Understeer
  - (b) Middlesteer
  - (c) Oversteer
  - (d) None of these
71. Draglink connects the steering arm/drop arm with:
- (a) Pitman arm
  - (b) Front axle
  - (c) Knuckle arm
  - (d) None of these
72. In Maruti 800, the following type of steering gear is used:
- (a) Worm and roller steering gear
  - (b) Cam and roller steering gear
  - (c) Rack and pinion steering gear
  - (d) None of these
73. The advantages of power steering are:
- (a) The required steering effort is considerably reduced and road shocks are not transmitted to the steering wheel.
  - (b) The overall cost is less
  - (c) Maintenance cost is less.
  - (d) None of these
74. An electronic power steering system consists of:
- (a) Torque sensor and rotation sensor
  - (b) Wheel sensor and torque sensor
  - (c) Rotary sensor and wheel sensor
  - (d) None of these
75. Turning radius is the radius of the circle on which the outside front wheel moves:
- (a) When the front wheels are turned to their extreme outer position
  - (b) When the rear wheels are turned to their extreme outer position
  - (c) When the front wheels are turned to their extreme inner position
  - (d) When the rear wheels are turned to their extreme inner position