

MIZORAM PUBLIC SERVICE COMMISSION

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

MECHANICAL ENGINEERING PAPER – II

Time Allowed : 2 hours

Full Marks : 150

All questions carry equal marks of 2 each.

Attempt all questions.

- Theory of machine is the branch of science, which deals with the study of
 - the relative motion between the parts of a machine and the study of forces which acts on those parts
 - the relative motion between the parts of a machine
 - the forces acting on the parts of the machine
 - none of these
- The angular velocities of the two pulleys, connected either by an open belt or a crossed belt are
 - directly proportional to their diameters
 - inversely proportional to their diameters
 - proportional to the square of their diameters
 - proportional to the square root of their diameters
- The Horse power transmitted by a belt is equal to
 - $\frac{T_1 \times V}{75}$
 - $\frac{T_2 \times V}{75}$
 - $\frac{T_1 + T_2}{27} \times \frac{V}{5}$
 - $\frac{T_1 - T_2}{75} \times V$

Where T_1 = Tension on tight side, T_2 = Tension on slack side. V = linear velocity of belt.
- Two parallel and co-planar shafts are connected by gears, this type of gears is called
 - helical gear
 - spur gear
 - bevel gear
 - spiral gear
- Natural frequency of a system is due to
 - free Vibration
 - forced Vibration
 - resonance
 - damping
- A simple mechanism consists of a mechanism with
 - two links
 - four links
 - six links
 - eight links

7. Which of the following is not a kinematic pair?
 - (a) sliding pair
 - (b) open pair
 - (c) turning pair
 - (d) self closed pair
8. The relative motion between the belt and the pulley surfaces due to changes of length when the belt passes from the slack side to the tight side is called
 - (a) slip of belt
 - (b) creep of belt
 - (c) slack of belt
 - (d) contract of belt
9. In reciprocating parts of two cylinder locomotives, the maximum magnitude of the unbalanced forces along the perpendicular to the line of stroke is known as
 - (a) tractive force
 - (b) hammer blow
 - (c) swaying couple
 - (d) leading couple
10. When a two wheeler (e.g. bike) move over a curved path, it is always inclined at an angle, say, θ , with the vertical plane. This angle is known as
 - (a) skid angle
 - (b) angle of heel
 - (c) angle of engine
 - (d) angle of rider
11. Due to weight transfer, the ratio of braking effect at the front and at the rear wheels should be
 - (a) 50% at front and 50% at rear
 - (b) 60% at front and 40% at rear
 - (c) 40% at front and 60% at rear
 - (d) none of these
12. Most anti-skid devices are employed on
 - (a) rear brakes
 - (b) front brakes
 - (c) secondary brakes
 - (d) parking brakes
13. The brake bleeding process removes from system
 - (a) air
 - (b) vacuum
 - (c) excess fluid
 - (d) excess pressure
14. Air Brakes are mostly used in case of
 - (a) cars
 - (b) jeeps
 - (c) trucks
 - (d) three wheelers
15. Normally, automotive brakes are
 - (a) greasy friction
 - (b) viscous friction
 - (c) wet friction
 - (d) dry friction
16. While braking automobile, the maximum retarding force is generally obtained in practice
 - (a) just before the wheel locks and skidding of the wheel takes place
 - (b) just after the wheel locks
 - (c) at the end of the skidding of the wheels
 - (d) as soon as the brake pedal is pressed
17. During braking, the brake shoe is moved outward to force the lining against the
 - (a) wheel piston or cylinder
 - (b) anchor pin
 - (c) brake drum
 - (d) wheel rim or axle
18. In the dual braking system, the master cylinder has
 - (a) one piston
 - (b) two pistons
 - (c) three pistons
 - (d) four pistons

19. The study which is used to find a simpler, easier and better way of performing a Job is known as
(a) time study (b) motion study
(c) motion and time study (d) none of these
20. In automobile industry, material handling is done by
(a) belt conveyor (b) overhead crane
(c) bucket conveyor (d) trolley
21. The simplex method is the basic method for
(a) queing theory (b) network analysis
(c) value analysis (d) linear programming
22. Acceptance sampling is used in
(a) batch production (b) mass production
(c) job production (d) none of these
23. PERT stands for
(a) Planning Estimation and Review Technique
(b) Planning Evaluation and Reporting Technique
(c) Programme Evaluation and Review Technique
(d) Process Evaluation and Reporting Technique
24. Location of an industrial plant is not affected by
(a) Nearness to raw materials (b) Transport facilities
(c) Nearness to markets (d) Efficiency of the labourers
25. Which of the following light is best for factory?
(a) Tungsten filament (b) Fluorescent tubes
(c) Mercury vapour lamps (d) Natural light
26. In production planning and control systems, which of the following is in the action phase?
(a) order writing (b) product design
(c) dispatching (d) data processing
27. Which of the following will normally be not continuous production?
(a) chemical processing (b) cigarette manufacturing
(c) cement manufacturing (d) welding shops
28. Which of the following will normally be not function of material management?
(a) receiving and ware-housing (b) standardization
(c) recruitment of staff (d) inventory control
29. The number of points at which the engine – clutch – gearbox unit is supported on the chassis frame is
(a) one (b) two
(c) three (d) four
30. The distance between the centres of the front wheel is called the
(a) track (b) wheel base
(c) axle width (d) turning circle
31. A frame consisting of side and cross members of channel section is normally used on
(a) light cars (b) motor cycles
(c) heavy motor cars (d) heavy commercial vehicles

32. The part of the vehicle that holds the passengers and the cargo to be transported is known as
(a) chassis (b) body
(c) sedan (d) cabin
33. Automobile chassis is provided with bolted, riveted or welded cross pieces to
(a) give extra weight (b) give extra strength
(c) tie together the parts (d) improve the design
34. In frameless chassis
(a) the floor is in tension and the roof is in compression
(b) the floor is in compression and the roof is in tension
(c) both the floor and the roof are in tension
(d) both the floor and the roof are in compression
35. In many automobile floor, grooves are provided to
(a) make the floor light (b) increase stiffness of the floor
(c) collect dust and dirt (d) beautify the floor design
36. 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
37. Spring eyes in case of cars are usually lined with
(a) bronze bushes (b) rubber bushes
(c) steel bushes (d) metal bushes
38. Another name for a damper is
(a) shock absorber (b) torsion bar
(c) spring (d) independent suspension
39. The gas used in modern shock absorbers is
(a) Nitrogen (b) Oxygen
(c) Hydrogen (d) Carbon dioxide
40. Which of the following is not a purpose of suspension system?
(a) to safeguard the occupants against road shocks
(b) to provide requisite height to body structure
(c) to adjust cost of the body structure
(d) to keep the body perfectly in level while travelling over uneven ground
41. A good suspension system should have
(a) springiness and damping (b) only springiness
(c) only damping (d) none of these
42. Three types of springs used in automotive suspension systems are
(a) coil, leaf and torsion bar (b) coil torsion bar and air
(c) leaf, air and gas (d) all of these
43. In a coil spring suspension systems, as the wheel passes over a bump, the shock absorber is
(a) expanded (b) extended
(c) compressed (d) none of these

44. Rotary motion of the steering wheel is converted to reciprocating motion by
(a) track arm (b) track rod
(c) stub axle (d) steering gear box
45. Another name for the steering link rod is
(a) track rod (b) tie rod
(c) drag link (d) pitman
46. The included angle is the sum of
(a) camber and castor (b) castor and SAI
(c) camber and SAI (d) camber and toe-in
47. The power steering has distinct advantage over the manual steering as
(a) the steering effort is considerably reduced
(b) in a power steered vehicle, there is less driver fatigue
(c) power steering leads to greater safety
(d) all of these
48. The steering ratio for manual steering of cars is approximately
(a) 5 (b) 15
(c) 500 (d) 100
49. In a steering system, the steering staff lies between the
(a) steering gear and the tie rods (b) steering gear and the pitman arm
(c) steering gear and steering wheel (d) pitman arm and tie rods
50. In a pitman – arm steering system, the steering arm is adjacent to the
(a) pitman arm (b) relay rod
(c) tie rod (d) idler arm
51. Which of the following is not a type of steering gear?
(a) worm and roller (b) cam and roller
(c) bevel and spur (d) worm and ball bearings
52. Which of the following is not correct? Wheel alignment refers to
(a) positioning of the front wheels and steering mechanism to promote easy steering
(b) reduce tyre wear to minimum
(c) increase steering shaft for better access of roads ahead by the driver
(d) provide directional stability to the vehicle
53. In power steering system, the pump that provides hydraulic pressure operates
(a) intermittently
(b) only when the pressure is needed
(c) continuously
(d) only after one degree turn of the steering wheel
54. The positive plate of lead acid battery has
(a) PbO_2 (b) Pb
(c) $PbSO_4$ (d) H_2SO_4

55. The output of an alternator is controlled by
(a) voltage regulator (b) cutout relay
(c) current regulator (d) all of these
56. The components of secondary ignition circuit include the secondary winding of ignition coil, distribution rotor, distributor cap and
(a) condenser (b) spark plugs
(c) ignition switch (d) distribution drive gear
57. In a starter motor the field windings are wound around
(a) armature (b) commutator
(c) brush (d) pole shoes
58. The two qualities used for specifying an electrical wire are
(a) the colour and length (b) the length and diameter
(c) the diameter and number of strands (d) the colour and diameter
59. You can quick charge the battery at as much as 50 amperes provided
(a) the electrolyte does not get too hot
(b) you do not charge for more than 5 minutes
(c) you make sure the battery is fully charged
(d) it remains connected to the electrical system
60. The alternator produces electricity in its
(a) rotor field (b) stator windings
(c) regulator (d) armature commutator
61. The Ignition coil has
(a) one winding (b) two windings
(c) three windings (d) four windings
62. The device in the distributor that moves the breaker cam ahead as engine speed increases is called the
(a) vacuum advance mechanism (b) centrifugal – advance mechanism
(c) full – advance mechanism (d) vacuum – brake mechanism
63. When jump starting a car, we use the battery from another car which is called as
(a) support battery (b) package battery
(c) booster battery (d) additional battery
64. The friction disc is positioned between the flywheel and the
(a) engine (b) crankshaft
(c) pressure plate (d) differential
65. Two advantages of using helical gears rather than spur gears in a transmission are
(a) high strength and low cost (b) high strength and less end thrust
(c) low noise level and high strength (d) low noise level and economy.
66. Central portion of propeller shaft is made from a
(a) steel shaft (b) gun metal shaft
(c) steel tube (d) cast iron rod

67. The function of a universal joint is to allow the propeller shaft to
(a) change length (b) bend sideways
(c) transfer torque at an angle (d) change inclination
68. The adjustment for backlash in a differential is provided between
(a) crown wheel and the sun gear (b) sun gear and the planet gear
(c) crown wheel and the drive pinion (d) crown wheel and the planet gear
69. The type of rear axle used on truck is
(a) semi floating (b) fully floating
(c) three quarter floating (d) none of these
70. The type of gears in which the teeth are parallel to and align with the center of the gear is called
(a) helical gears (b) bevel gears
(c) worm gears (d) spur gears
71. The gear shift lever requires two separate motions to shift gear and the first movement
(a) moves the synchronizer (b) selects the synchronizer
(c) meshes the gears (d) operates the clutch
72. The propeller shaft lies between
(a) the transmission and the front wheels (b) the differentials and the front wheels
(c) the transmission and the differential (d) none of these
73. The Universal joints takes care of the
(a) change in length (b) change in drive angle
(c) change in drive speed (d) change in gear shift
74. Noise when going around a curve indicates the trouble is
(a) due to heavy contact on the heel ends of the bevel gears
(b) due to heavy contact on the toe ends of the bevel gears
(c) in the differential case
(d) due to slippage of the clutch surfaces
75. With part-time four wheel drive, the transfer – case shift lever must be moved to engage or disengage
(a) the rear differential (b) the front differential
(c) both front and rear differential together (d) none of these

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