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NOTIFICATION

No. A.12018/12/2024-TRP, the 27th May, 2024: In the interest of public service, the Governor of Mizoram is pleased to notify syllabus for Direct Recruitment examination to the post of Motor Vehicle inspector (MVI) under Transport Department as approved by DP&AR (GSW) vide their ID.No.A.22022/5/2023-P&AR(GSW) dt.21.5.2024 and as listed in the Annexure with immediate effect.

Dr. Lalzirmawia Chhangte
Secretary to the Govt. of Mizoram
Transport Department.

APPROVED SYLLABUS FOR DIRECT RECRUITMENT TO THE POSTS OF MOTOR VEHICLE INSPECTOR(MVI) UNDER TRANSPORT DEPARTMENT

PAPER	SUBJECT	MARKS	DURATION
Paper -I	**PART-A**		
	General Knowledge(50 Questions)	100	3 hours with compensatory time of 20 minutes per hour for persons with benchmarked disabilities.
	General English(25 Questions)	50	
	Part-B		
	Precis Writing	10	
	Essay Writing	20	
	English Comprehension-(Conventional)	20	
	TOTAL	**200**	
Paper-II	Basic Computer Knowledge (35 Questions)	70	3 hours with compensatory time of 20 minutes per hour for persons with benchmarked disabilities.
	Simple Arithmetic(30 Questions)	60	
	General Intelligence & Reasoning (35 Questions)	70	
	TOTAL	**200**	
Mechanical Engineering Paper-III	MECHANICAL ENGINEERING		3 hours with compensatory time of 20 minutes per hour for persons with benchmarked disabilities.
	Automobile Engine	15	
	Mechanical Measurements	10	
	Machine Tools	15	
	Fuel system in Automobile	10	
	Manufacturing process	10	
	Cooling system in Automobile	10	
	Lubrication system in automobile	10	
	Foundry Technology	10	
	Wheels & Tyres	10	
	TOTAL	**100**	
Mechanical Engineering Paper-IV	Theory of Machines	15	3 hours with compensatory time of 20 minutes per hour for persons with benchmarked disabilities.
	Braking System	10	
	Production Management	15	
	Chassis & Body	10	
	Suspension system	10	
	Steering System	15	
	Electrical System	10	
	Transmission System	15	
	TOTAL	**100**	

Automobile Engineering Paper-III	**AUTOMOBILE ENGINEERING**		3 hours with compensatory time of 20 minutes per hour for persons with benchmarked disabilities.
	Introduction	20	
	Engine	20	
	Power Train	20	
	Suspension Systems	20	
	Steering system	20	
	TOTAL	**100**	
Automobile Engineering Paper-IV	Fuel System	15	3 hours with compensatory time of 20 minutes per hour for persons with benchmarked disabilities.
	Cooling system	15	
	Lubrication system	15	
	Wheels	10	
	Braking System	15	
	Chassis and Body	15	
	Electrical System	15	
	TOTAL	**100**	

Notes:

1) Questions will be set in objective type multiple choice pattern only except for essay writing and English comprehension under Paper-I with all questions carrying equal marks and answers for each of the questions which will be marked using blue or black ball point pen. In other words, there will be multiple probable answers (at least four) wherein the candidate has to choose the correct answer for every objective type question.
2) Questions will be set in tune with the level of educational qualifications prescribed in the corresponding Recruitment Rules/ Service Rules for the post(s).
3) A brief description of the common syllabus for direct recruitment to the post of MVI is as follows:

Paper-I

General Knowledge: Questions will be designed to test the candidate's knowledge of current events and of such matters of everyday observation and experience as may be expected of and educated person. The test will also include questions relating to Indian history and culture, Indian polity including the Constitution of India, geography, economy and general science. Questions on Mizo history and culture will also form part of the syllabus.

General English: Questions in this component will be designed to test the candidate's understanding and knowledge of English Language and will be based on error recognition, fill in the blanks (using verbs, prepositions, articles etc), vocabulary, spellings, grammar, sentence structure, synonyms, antonyms, sentence completion, phrases and idiomatic use of words, etc.

Essay writing: Question on essay writing will be designed to test the candidate's grasp of his material, its relevance to the subject chosen, and to his ability to think constructively and to present his ideas logically, constructively and concisely.

English Comprehension: There will be questions on comprehension of passages also to test the vocabulary, grammar, logical thought ability and overall grasp of the candidates over English language.

Paper-II

Basic Computer Knowledge: Introduction to computers, introduction to graphical user interface based operating system, elements of word processing, spreadsheets, power presentations, computer communication and internet, worldwide web browser, communication and collaboration.

Simple Arithmetic: Number system simplification, roots, averages, discounts, percentage profit and loss, ratio and proportion, partnership, chain rule , time and work, time and distance, simple and compound and interest, mensuration, permutation and combinations, height and distance, line graph, bar graph, pie chart and tabulation.

General Intelligence & Reasoning: This portion will include questions of both verbal and non-verbal type. This component may include questions on analogies, similarities and differences, spatial visualization, spatial orientation, problem solving, analysis, judgement, decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning and figural classification arithmetic number series, non-verbal series, coding and decoding, statement conclusion, syllogistic reasoning etc.

MECHANICAL ENGINEERING - PAPER-III (100 MARKS)

1.0 AUTOMOBILE ENGINE : 15 marks
1.1 Classification of I.C Engine
1.2 Working principle & application of 4-stroke & 2 stroke petrol engine.
1.3 Working principle & application of 4-stroke diesel engine.
1.4 Engine performance & its measurement.

2.0 MECHANICAL MEASUREMENTS : 10 marks
2.2 Classification of measuring instruments
2.3 Types of measuring instruments
2.4 Classification of gauges
2.5 Types of gauges

3.0 MACHINE TOOLS : 15 marks
3.1 Milling machine
3.2 Boring machine
3.3 Grinding machine
3.4 Gear hobbing machine
3.5 Capstan & Turret Lathe

4.0 FUEL SYSTEM IN AUTOMOBILE : 10 marks
4.1 Characteristics of fuels
4.2 Requirement of good fuel-octane rating, cetane rating, sulphur content
4.3 Fuel supply system in diesel & petrol engine
4.4 Supercharging of I.C engine

5.0 MANUFACTURING PROCESS : 10 marks
5.1 Introduction to metallurgy
5.2 Heat treatment of steel
5.3 Brazing, Braze welding & soldering
5.4 Gas welding & cutting
5.5 Electric welding

6.0 COOLING SYSTEM IN AUTOMOBILE : 10 marks

6.1 Different types of cooling system: 10 marks
(i) Air cooling system
(ii) Liquid/Water cooling system

7.0 LUBRICATION SYSTEM IN AUTOMOBILE : 10 marks

7.1 Purpose of lubrication
7.2 Different types of lubricating system
7.3 Parts of lubrication system

8.0 FOUNDRY TECHNOLOGY : 10 marks

8.1 Introduction
8.2 Pattern making
8.3 Moulding & coremaking
8.4 Melting & Casting

9.0 WHEELS & TYRES : 10 marks

9.1 Different types of wheels
9.2 Different types of Rims
9.3 Different types of tyres
9.4 Maintenance of tyres

MECHANICAL ENGINEERING - PAPER-IV (FULL MARKS-100)

1.0 THEORY OF MACHINES : 15 marks

1.1 Mechanism
1.2 Belt, Rope & Chain drive
1.3 Gear drive
1.4 Balancing & Vibration
1.5 Gyroscope

2.0 BRAKING SYSTEM : 10 marks

2.1 Principle & requirement of brake in automobile
2.2 Different types of brakes

3.0 PRODUCTION MANAGEMENT : 15 marks

3.1 Plant location, layout & material handling
3.2 Production planning & control
3.3 Inspection & quality control
3.4 Materials management & inventory control

4.0 CHASSIS & BODY : 10 marks

4.1 Functions of chassis frame
4.2 Types of chassis frames
4.3 Construction of chassis & body

5.0 SUSPENSION SYSTEM : 10 marks

5.1 Purpose of suspension system
5.2 Characteristics of good suspension system
5.3 Types of suspension system
5.4 Dampers Purpose, friction, types.

6.0 STEERING SYSTEM : 15 marks

6.1 Purpose of steering system
6.2 Fifth wheel steering system
6.3 Ackerman steering system
6.4 Parts of steering system
6.5 Types of steering gears
6.6 Definition of reversibility
6.7 Power steering -Principle of working & advantages
6.8 Concepts on turning radius, steering ratio, centre point steering
6.9 Alignment of wheel

7.0 ELECTRICAL SYSTEM : 10 marks

7.1 Types of battery, method & principle of battery charging
7.2 Dynamo & Alternator - Purpose, parts, principle of working
7.3 Ignition system
7.4 Starting system
7.5 Lighting & auxiliary equipments

8.0 TRANSMISSION SYSTEM : 15 marks

8.1 Clutch-Functions, types & working principles of different types of clutch.
8.2 Gear boxes-Functions, types & working principles.
8.3 Constructions & functions of propeller shafts.
8.4 Working principles of different types of universal joints.
8.5 Differential-Purpose, principles, construction.
8.6 Drive system - Front wheel drive, Four wheel drive.

AUTOMOBILE ENGINEERING - PAPER-III (100 MARKS)

1.0 INTRODUCTION: 20 marks

1.1. Definition of automobile
1.2 Units of automobile-body: floor assembly, panels, bonnet assembly, roof assembly, year tank lid, quarter panels, front side assembly, engine hood, bumpers, doors, chassis: frame, power unit, power train, running system.
1.3 Different types of chassis layouts- front engine driving the rear wheels, transverse engine driving the front wheels, rear engine driving the rear wheels, four wheel drive.
1.4 Classification of vehicles according to the following criteria requirement, load carrying capacity, type of body, type of derive, number of wheels, fuel used, number of seats, model and make total piston displacement volume, type of control, number of doors, position of engine.
1.5 Garage tools and equipment - basic tool kit and additional tools for a mechanic.

2.0 ENGINE : 20 marks

2.1 Classification of internal combustion engine reciprocating:
Compression ignition, spark ignition, wankel, rotary.
2.2 Classification of reciprocating engines on following criteria type of cycle, number of cylinder, type of fuel used, arrangement of cylinder, arrangement of valves, arrangement of camshaft, engine speed, method of cooling.
2.3 Theoretical heat cycles -otto cycle, diesel cycle, mixed cycle.
2.4 Petrol engine - working principle and application of four stroke petrol engine.
2.5 Diesel engine - working principle and application of four stroke engine and two stroke engine.
2.6 Combustion-exhaust emissions: hydrocarbons, carbon monoxide, oxides of nitrogen; emission control approaches modification of engine design, modification of fuel, exhaust gas treatment;

detonation, pre-ignition, valve timing diagram.

2.7 Engine performance and its measurement bore and stroke, swept volume and clearance volume, compression ration; engine torque; mean effective pressure; horse power: BHP, IHP, FHP, engine efficiencies, air standard, mechanical, thermal, indicated thermal, broke thermal, volumetric; specific fuel consumption; performance curves: torque versus engine speed, BHP versus RPM, FHP versus RPM, specific fuel consumption versus RPM.

3.0 POWER TRAIN : 20 marks.

3.1 Transmission- elements of power transmission from crank shaft to rear axle.

3.2 Clutch- functions of clutch, working principles of different types of clutch: cone, inverted cone, single plate, multi-plate, diaphragm, automotive.

3.3 Gear boxed- construction and working principles of different types of gear boxes: sliding, constant mesh, synchromesh, epicycle, automatic; gear box lubrication.

3.4 Propeller shaft- functions, construction.

3.5 Universal joints- working principles of different types of universal joints.

3.6 Differential - purpose, principle, construction.

3.7 Drive systems- front wheel drive, four wheel drive.

3.8 Rear axles forces on near axles.

3.9 Live axles: semi-floating, three-quarter floating, fully floating.

3.10 Front axles - steering heads

3.11 Power take-off shaft

3.12 Dead front axle

4.0 SUSPENSION SYSTEMS: 20 Marks

4.1 Functions of suspension system and characteristics of a good suspension system and characteristics.

4.2 Working principles of different suspension systems: conventinal independent front or rear, air hydroelastic.

4.3 Working principles of different types of suspension springs: leaf, coil torsion, air, rubber, hydroelastic.

4.4 Dampers - purpose, function, types.

4.5 Working principles suspensions- air, hydrogas, hydroelastic.

5.0 STEERING SYSTEMS: 20 marks

5.1 Functions and requirements of a steering system.

5.2 Steering mechanisms: Ackerman.

5.3 Definition over-steer and under-steer

5.4 Arrangement of steering system steering wheel, steering column, steering shaft, drop arm, drag link.

5.5 Types of steering gears- worm and sector, rack and pinion, reciprocating ball, warm and roller, cam and lever, screw and nut.

5.6 Definition of reversibility.

5.7 Power steering- advantages and principle of working

5.8 Concepts on turning radius, steering ration, centre point steering.

5.9 Wheel alignment: camber, caster, king pin inclination, toe-in, toe-out drawing turns, wheel alignment-setting.

AUTOMOBILE ENGINEERING - PAPER-IV (100 MARKS)

1.0 FUEL SYSTEM : 15 marks

1.1 Characteristics of fuels for automobile engines.

1.2 Requirements of a good fuel-octane rating, cetance rating, sulphur content, gum, content.

1.3 Carburetion and air fuel ratios
factors affecting carburetion temperature, time, quality, engine design; air fuel ratios.

1.4 Simple carburettor and its limitations - functions of carburettor, principle of operation, construction and working of simple carburettor, limitations.

1.5 Modern carburettor system- float, starting idle and low speed, high speed, accelerating

1.6 Working principle of difficult types of carburettors -fixed choke and variable pressure type, variable choke and constant pressure type, updraft, down draft, side draft, zenith carburettor, solex carburettor, su-carburettor.

1.7 Fuel supply system-petrol engines: tank, fuel, lines, filters mechanical fuel pump, electric fuel pump, petrol injection system; diesel engines: methods of fuel injection, injector types, fuel injection pump, primary and secondary fuel filters.

1.8 Supercharging of L.C. engines, governing system; mechanical, pneumatic and hydraulic.

2.0 COOLING SYSTEM : 15 marks

2.1 Comparison among different types of cooling systems: water cooling, air cooling.

2.2 Parts of air cooling and water cooling systems.

2.3 Anti-freeze mixtures-characteristics and examples

3.0 LUBRICATION SYSTEM : 15 marks

3.1 Purpose of lubrication and parts of engine that require lubrication.

3.2 Lubricating oil-function of lubricating oil, properties of lubricating oil.

3.3 Principles of different types of lubrication system- petrol, splash, semi-pressure, pressure, wet-sump, dry sump.

3.4 Parts of lubrication system- oil sump, oil pump, oil relief valve, oil filter, oil dip stick, oil pressure indicating light, oil pressure gauge.

4.0 WHEELS : 10 marks

4.1 Types of wheels and requirements of road wheels, types of commercial vehicle wheels.

4.2 Rims-types of rims

4.3 Tyres-description of different types of tyres, tyre specification, factors affecting tyre life.

5.0 BRAKING SYSTEM: 15 marks

5.1 Principle of broking and requirement of brake.

5.2 Construction and working principle of different types of brakes-drum brakes, disc brakes, mechanical brakes, compressed air brakes, air hydraulic brakes.

6.0 CHASSIS AND BODY: 15 Marks

6.1 Functions of chassis frame, types of chassis frames: conventional frame, integral construction

6.2 Different types of frames, car frame, track frame, tubular frame, sub frame Body requirements and types.

7.0 ELECTRICAL SYSTEMS: 15 marks

7.1 Battery-types, principle of hattery charging, capacity, methods of charging.

7.2 Dynamo and alternator-purpose, parts, principle of working.

7.3 Ignition system-parts of ignition circuit, magneto ignition system.

7.4 Starting system- purpose, circuit, construction.

7.5 Lighting and auxiliary equipment - Lighting circuit, components of lighting system, components operated by electricity, head lamp, electric horn wind screen wiper.

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