Question Paper

Exam Date & Time: 01-Jan-2020 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
END SEMESTER THEORY EXAMINATIONS
NOVEMBER 2019
III SEMESTER B.sc. (Applied Sciences) in Engg.
AUTOMOBILE ENGG. [IME 235]

Marks: 100 **Duration: 180 mins.**

Answer 5 out of 8 questions.
Any missing data may be suitably assumed.

1)		List any five requirements of clutches.	(5)
	A)		
	B)	With neat sketches explain the working of wishbone arm type independent front suspension system.	(7)
	C)	Write short notes on valve timing diagram of petrol engine with neat sketches.	(8)
2)		With neat sketches explain the working of centrifugal ignition advance mechanism.	(10)
	A)		
	B)	With a neat sketch explain the working principle of constant mesh gear box system.	(10)
3)		List any five differences between battery and magneto ignition system.	(5)
	A)		
	B)	Sketch and explain the working principle of overhead valve under head cam shaft engine.	(5)
	C)	Sketch and explain the working of bellows type thermostat valve.	(10)
4)		With a neat sketch explain the working of swinging caliper disc brake.	(5)
	A)		
	B)	Draw a neat labeled sketch of electrical fuel pump.	(5)
	C)	Sketch and explain semi floating and three quarter floating rear axles.	(10)
5)		List any three functions of piston rings.	(3)
	A)		
	B)	Sketch and explain any two types of fuel injectors based on their location.	(7)

C) With a neat block diagram explain the working of pneumatic braking system. (10)

6) With a neat sketch explain the working of splash lubrication system. (5)

A)

B) Draw a neat labeled sketch of recirculating ball type steering gear. (5)

C) A car has kerb weight of 9700N and wheel base of 2520mm. Its C.G. is 1350mm in front of the rear axle and 700mm above the level road. The coefficient of road wheels adhesion is 0.65. If the car is moving upward on a road inclined at an angle 30^0 with the horizontal, calculate the load distribution on the front and the rear axles, the retardation and the stopping distance while moving at 65km/hr. (10)
i)rear brakes are applied
ii) all the four wheel brakes are applied. The seating capacity of the vehicle is for 5 persons including the driver. Take weight of each person as 550N.

7) With a neat sketch explain wire wound piston. (5)

A)

B) A motor car engine develops 5.9KW at 2100 rpm. Find the suitable size of clutch plate having friction linings riveted on both sides, to transmit the power, under the following conditions: (7)

i) Intensity of the pressure on the surface not to exceed 6.87×10^4 Pa
ii) Slip torque and losses due to wear etc. is 35% of engine torque.
iii) Coefficient of friction on contact surface is 0.3.
iv) Inside diameter of the friction plate is 0.55 times the outside diameter.

C) Sketch and explain any three types of rubber springs. (8)

8) List and explain any five desirable properties of tyres. (5)

A)

B) A motor car has a wheel base of 2.75 m and pivot center of 1.28 m. The front and rear wheel track is 1.45 m. Calculate the correct angle of outside lock and turning circle radius of the outer front and inner rear wheels when the angle of inside lock is 40°. (7)

C) With a neat sketch explain the provision to overcome acceleration difficulties in simple carburetor. (8)

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