Registration No : | | | | | | | | | | |

Total Number of Pages : 02 **B.Tech.**
PME6J005

6th Semester Regular Examination 2017-18
AUTOMOBILE ENGINEERING
BRANCH : MECH
Time : 3 Hours
Max Marks : 100
Q.CODE : C452

Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.

Part – A (Answer all the questions)

Q1 **Answer the following questions : *multiple type or dash fill up type :*** **(2 x 10)**

a) Find out the odd one from the following :
a) Master cylinder b) Engine cylinder
c) Wheel cylinder d) Brake drum

b) The rating of diesel engine will ……with increase in air-inlet temperature
a) Increase parabolically b) Increase linearly
c) Decrease parabolically d) Decrease linearly

c) The air resistance of a vehicle moving with a velocity of 120 km/h is 190 N. The air resistance of the vehicle moving with 100 km/h will be
a) 176.58 N b) 151.07 N
c) 127.53 N d) 98.1 N

d) Digital Twin Spark Ignition technology is patent of which company?
a) Honda b) Yamaha
c) TVS d) Bajaj

e) 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 economy d) Low noise level and high strength

f) The component of the torque converter that allows multiplication of torque is the
a) Turbine b) Impeller
c) Freewheel d) Stator

g) The included angel is sum of the
a) Camber and castor b) Castor and S.A.I.
c) Camber and S.A.I. d) Camber and toe-in

h) ……..is used to check the state of charge of a battery.
a) Battery charger b) Hygrometer
c) Hydrometer d) Battery eliminator

i) Which one of the following variable is sensed by an EGR lift sensor?
a) The oxygen content of the exhaust gas
b) The exhaust gas temperature
c) The extent to which the EGR valve is open
d) The exhaust gas flow rate

j) The fading of brakes occur
a) At high speeds b) At low speeds
c) When brake lining is worn d) During continuous brake application

Q2 **Answer the following questions : *Short answer type :*** **(2 x 10)**

a) What does "WP 29" stand for?

b) What is the draw back with the two leading shoe type brakes?

c) Explain the term double declutching.
d) What causes under steer and what are its disadvantages?
e) What is aerodynamic drag coefficient of a vehicle?
f) What is the correct gap for contact breaker points? How is the contact breaker points adjusted?
g) What are the advantages of an alloy wheel?
h) What is vapour lock? How is it removed?
i) Write short note on "Vehicle design parameters".
j) What is the advantage of front wheel drive?

Part – B (Answer any four questions)

Q3 **a)** How is fully floating axle is different from semi-floating rear axle? **(6)**
b) Enlist the titles of various chapters of Motor Vehicle Act, 1988. **(6)**
c) Describe wheel alignment. What are the factors related to it? **(3)**

Q4 **a)** A motor car weighing 13341.6 N and has an engine developing 40.5 bkW at 4000 rpm. The transmission system has an efficiency of 90% in top gear and 85% in second gear. The top gear ratio is 1:1 and the second gear ratio 1.64: 1, when running on level with wide open throttle, the car reaches 112 km/h at 4000 rpm and at the same engine speed in second it will just climb a hill of 1 in 12. If the resistance to motion on level is given by the formulae $R = A + BV^2$, where R is in N and V in km/h. Calculate A and B. Compute the maximum speed with which the car can climb a grade of 1 in 20 in top gear. What is corresponding engine speed? Assume that engine power is proportional speed in the above range. **(10)**
b) Compare the properties of petrol, diesel, CNG and LPG. **(5)**

Q5 **a)** Explain with a neat sketch a 'hydraulic braking system'. **(8)**
b) A car is going at a speed of 60 kmph when brakes were applied, it took 25 meters to stop. Determine the braking efficiency and the value of retardation. Take coefficient of friction as 0.8 between road and the tyres. **(4)**
c) What are the disadvantages of water as a coolant? **(3)**

Q6 **a)** What is overdrive? Describe its working with a neat sketch. **(10)**
b) A 3-forward speed and one reverse speed gear box (sliding mesh type) has to be designed. The gear box should have the following gear ratio: Top gear – 1:1, second gear – 1.5, third gear – 2.5 and reverse gear – 3.9. **(5)**
The distance between the axes of main shaft and layshaft is to be kept at 80 mm. The clutch gear should have 16 teeth with a diametral pitch of 3.20 mm.

Q7 **a)** With the help of a neat diagram describe Hotchkiss drive. How does it differ from Torque tube drive? **(6)**
b) Write a note on the cut-out relay as used in the battery generator circuit. **(5)**
c) An automobile has a wheel base of 2.743 m and pivot centre 1.065 m. The front and rear wheel track is 1.217 m. Calculate the correct angle of outside lock and turning circle radius of the front outer wheel and rear inner wheel, when the angle of inside lock is 40°. **(4)**

Q8 **a)** Explain the necessity of power steering in an automobile. Describe briefly 'Electronic power steering'. **(10)**
b) What is the function of a starting drive? Name different types of starting drives. Describe construction and working of any type of Bendix drive. **(5)**

Q9 **Write short notes on :**
a) Hybrid Vehicles **(5)**
b) Cruise control **(5)**
c) Scavenging **(5)**