GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022

B. Tech Degree Examinations, June – 2021

(Sixth Semester)

BMEPE6030 – AUTOMOBILE ENGINEERING

(Mechanical Engineering)

Time: 2 hrs   Maximum: 50 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions)   **(1 x 10 = 10 Marks)**

Q.1. Answer **ALL** questions

a. The air resistance to a car at 20 kmph is *R*. The air resistance at 40 kmph will be

     (i) $4R^2$ (ii)   4R

     (iii)   2R   (iv)   R

b. The function of a first compression ring (top ring) is that it

     (i) Maintains a seal and prevents the fuel leakage   (ii) Maintains a seal and prevents escape of burned gases and loss of pressure in the combustion chamber

     (iii) Creates swirl   (iv) Increases the combustion temperature

c. The instrument used to check specific gravity of acid in a battery is

     (i)   Hygrometer   (ii)   Hydrometer

     (iii)   Anemometer   (iv)   Venturimeter

d. The condition that results in large quantities of HC emission is

     (i)   High temperature combustion   (ii)   High atmospheric temperature combustion

     (iii)   High temperature combustion   (iv) Incomplete combustion

e. The engine oil viscosity is defined by _____ ratings.

     (i)   Automatic transmission fluid (ATF)   (ii) Gross vehicle weight (GVW)

     (iii) Society of automotive engineers (SAE)   (iv) American petroleum institute (API)

f. The cam shaft of a four stroke Diesel engine running at 1000 rpm will run at

     (i)   4000 rpm   (ii)   2000 rpm

     (iii)   1000 rpm   (iv)   500 rpm

g. The valve overlap in four stroke petrol engines is approximately

     (i)   10°   (ii)   30°

     (iii)   50°   (iv)   70°

h. The correct way to rectify an imbalanced wheel is to

     (i)   Adjust the tyre pressure   (ii)   Rotate the tyres

     (iii)   Attach appropriate weighs to the wheel at appropriate positions   (iv)   Adjust the damper spring tension

i. Highest useful compression ratio is the highest compression ratio at which

     (i)   Engine can run   (ii)   Engine gives maximum output

     (iii)Engine is most efficient   (iii)   Fuel can be used in a test engine without knocking

j. The heat transfer from coolant to air in the radiator of an automobile engine takes place by

     (i)   Conduction, convection and radiation   (ii)   Convection and radiation

     (iii)   Radiation only   (iv)   Convection only

PART – B: (Short Answer Questions)   **(2 x 5 = 10 Marks)**

Q.2. Answer *ALL* questions

    a. Define universal joint and its uses in automobiles?

    b. What are disadvantages of frameless chassis?

    c. Explain working of a disk brake system

    d. What is slip joints?

    e. What is the need for a cooling system?

PART – C: (Long Answer Questions)   **(6 x 5 = 30 Marks)**

Answer *ANY FIVE* questions   Marks [CO#] [PO#]

		Marks	[CO#]	[PO#]
3.	Explain the construction and working principle of any type of power steering in automobile?	(6)	3	1
4.	Explain Solar powered vehicles with neat sketch	(6)	4	1

5.	Write short notes on
	    • Power steering
	    • Torque converter
		(6)	2	1

6.	A plate clutch has a single surface with an outside diameter of 250mm and inside diameter of 100mm with a coefficient of friction 0.2.Find the required axial force to develop a maximum pressure of 0.65MPa.Under the pressure, find the torque capacity of the clutch?	(6)	2	2
7.	What is fluid coupling and its working principle and application with neat sketch diagram?	(6)	2	1
8.	Discuss in detail MPFI system for petrol engine? How it is different from CRDI system in diesel engine?	(6)	1	1

9.	For an automobile with wheelbase 2.5 m. Centre of gravity lies 0.6 m above the ground and 1.15 m in front of the rear axle. The automobile is moving on level ground with a speed of 45 kmph. Find the minimum stopping distance when
	
	    (i) Only rear wheels are braked
	    (ii) Only front wheels are braked
	    (iii) Brake applied to all four wheels
		(6)	2,3	2

10.	For a motor weighing 13500 N, the air resistance (in N) is given by $0.02AV^2$, where is A is frontal area and V is velocity in kmph. The rolling resistance is 1/100 th weight of the vehicle. Car speed 56 kmph and car frontal area is 2.5 m². Determine the maximum gradient which the vehicle can climb if tractive effort available at this wheel is estimated to be 1860 N.	(6)	1	2

--- End of Paper ---