

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP2023)

CLASS: B. TECH
BRANCH: MECHANICAL

SEMESTER: VI
SESSION: SP/2024

SUBJECT: ME305 AUTOMOBILE ENGINEERING

TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates
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Q.1(a)	Briefly explain the working of a strain gauge.	[2]	1 2
Q.1(b)	Explain the role of lambda sensor in an automobile.	[3]	1 3
Q.2(a)	Explain the working of thermistor and RTD. Also state the major differences.	[2]	1 2
Q.2(b)	Sketch the construction of battery ignition system and explain its working.	[3]	1 3
Q.3(a)	Describe acceleration and gradeability with their expressions.	[2]	1 2
Q.3(b)	With neat sketch explain the working of LVDT.	[3]	1 2
Q.4	Obtain the expression for maximum acceleration and reaction forces for rear-wheel-drive vehicle.	[5]	2 6
Q.5	A passenger car, with gross mas of 1100 kg, travelling at 80 km/hr is accelerated up a gradient of 1 in 20, the vehicle has a frontal area of 1.9 m ² and air resistance coefficient of 0.02688. The rolling resistance is given by the formula $R_r = 0.0112 mg + 0.00006 mgV$. Where V is in km/hr and m is in kg. At 80 km/hr the engine develops 60 kW corresponding to an engine speed of 4400 rpm. Rear axle ratio is 5:1. The transmission efficiency is 95%. Assume the wheel radius is 0.334 m. Calculate: i. The total resistance. ii. The tractive effort available.	[5]	2 5

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