Name:

Enrolment No:

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Course: Components of Automotive Chassis (MEAD-2001) **Semester: III**

Programme: ADE

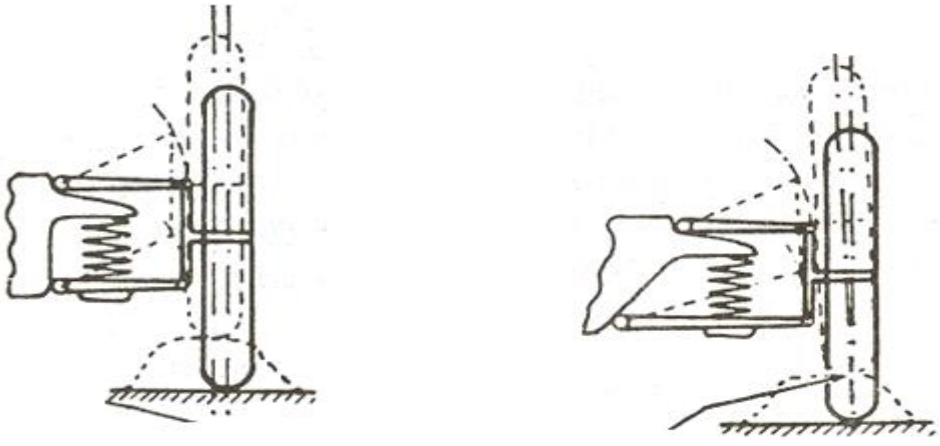
Time: 03 hrs. **Max. Marks: 100**

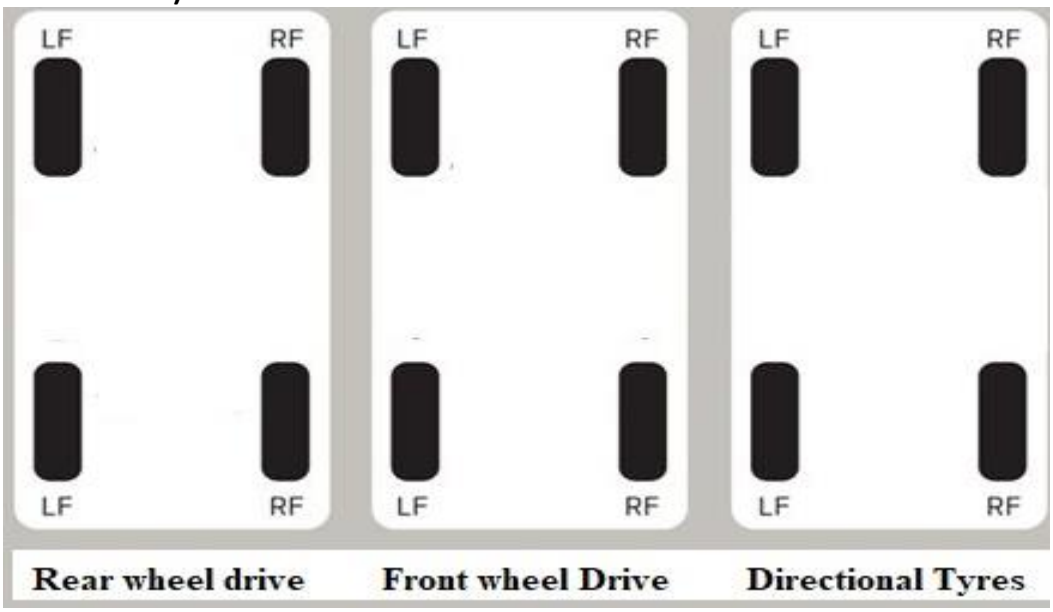
Instructions:

SECTION A

S. No.		Marks	CO
Q 1	Define Camber and explain why positive camber is preferred in passenger cars	5	CO3
Q 2	Designate the Bias belted tyre used for the passenger cars for the following Dimensions **(Candidate can use Annexure I, if necessary)** a. Width of the tyre - 205 mm b. Aspect ratio - 55 c. Rim diameter - 20” d. load carrying capacity at 2.5 bar inflation Pressure is- 670 kg e. Maximum speed of the vehicle is - 220 KMPH Also calculate the section height of the tyre.	5	CO4
Q 3	Ackerman steering geometry is more preferable in passenger cars instead of Davis steering geometry, Explain in brief.	5	CO3
Q 4	A car of a mass 800 kg is travelling at 36 km/h. Determine A) The kinetic energy it possesses (kJ) B) The average braking force (N) to bring it to rest in 20 meters.	5	CO5

SECTION B

Q 5	Identify the suspension system shown in Fig 1 A and B and Analyze the Camber vs. Tyre traction with road for the following conditions and also recommend which one should be used in vehicle with justification.  (A) Fig 1 (B)	10	CO4

Q 6	Draw the line diagram of Anti-Lock Braking System and explain its working along with advantages and disadvantages.	**10**	**CO5**
Q 7	Identify the following catagories of chassis as shown in Fig 2 A and B and compare them on the basis of Pros and Cons with each other.   **(A)** **Fig 2** **(B)**	**10**	**CO1**
Q 8	A) Explain the importance of "Rotation of tyre" in automobiles. B) In given fig 3, Kindly show the tyre rotation pattern **(Attached to the main answer sheet).**  **Fig 3**	**10**	**CO4**
	SECTION-C		
Q 9	Draw a line diagram of air suspension system used in four wheeled automobile and explain the following entities related to air suspension system. A) flow of air takes place B) Controlling of chassis height C) Air spring is superior to leaf, coil or solid rubber spring. True or false, Justify. D) Drawback of air suspension system.	**20**	**CO4**
Q 10	Develop the Road Performance Curves for the following conditions and identify points 'a' and 'b'	**20**	**CO2**

	a. maximum speed for a given vehicle and engine b. the desired speed Conditions: 1. Total resistance (Rolling + Aerodynamic + gradient) including under full throttle conditions 2. Power curve for lower gear at full throttle 3. Power curve for top gear at full throttle 4. Power curve for top gear at part-throttle		
	OR		
Q11	As an automobile engineer you have been asked to prepare a propeller shaft for the vehicle with 5 m wheel base. You can select the components for preparing the assembly as given below. 1. support bearing/s 2. universal joint/s 3. slip joint/s 4.drive shaft/s 5. CV joints A) Name the assembly B) Explain the purpose of each component you used in an assembly. C) Draw a line diagram with label of the assembly you prepared.		**CO5**

Annexure – I

Load and Speed Index sheet for selection of Tyres

Load Index

Load index	Wheel load capacity in kg with tyre pressure measured in bars 1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5
69	215	225	240	250	260	270	285	295	305	315	325
70	225	235	245	260	270	280	290	300	315	325	335
71	230	240	255	265	275	290	300	310	325	335	345
72	235	250	260	275	285	295	310	320	330	345	355
73	245	255	270	280	295	305	315	330	340	355	365
74	250	260	275	290	300	315	325	340	350	365	375
75	255	270	285	300	310	325	335	350	360	375	387
76	265	280	295	310	320	335	350	360	375	385	400
77	275	290	305	315	330	345	360	370	385	400	412
78	280	295	310	325	340	355	370	385	400	410	425
79	290	305	320	335	350	365	380	395	410	425	437
80	300	315	330	345	360	375	390	405	420	435	450
81	305	325	340	355	370	385	400	415	430	445	462
82	315	330	350	365	380	395	415	430	445	460	475
83	325	340	360	375	390	405	425	440	455	470	487
84	330	350	365	385	400	420	435	450	470	485	500
85	340	360	380	395	415	430	450	465	480	500	515
86	350	370	390	410	425	445	460	480	495	515	530
87	360	380	400	420	440	455	475	490	510	525	545
88	370	390	410	430	450	470	485	505	525	540	560
89	385	405	425	445	465	485	505	525	545	560	580
90	400	420	440	460	480	500	520	540	560	580	600
91	410	430	450	475	495	515	535	555	575	595	615
92	420	440	465	485	505	525	550	570	590	610	630
93	430	455	475	500	520	545	565	585	610	630	650
94	445	470	490	515	540	560	585	605	625	650	670
95	460	485	505	530	555	575	600	625	645	670	690
96	470	495	520	545	570	595	620	640	665	685	710
97	485	510	535	560	585	610	635	660	685	705	730
98	500	525	550	575	600	625	650	675	700	725	750
99	515	540	570	595	620	650	675	700	725	750	775
100	530	560	590	615	640	670	695	720	750	775	800

Speed Index

Top speed of car ($km\ h^{-1}$)	Tyre load capacity (%) Speed symbol V	W	Y Tyres
210	100	100	100
220	97	100	100
230	94	100	100
240	91	100	100
250	–	95	100
260	–	90	100
270	–	85	100
280	–	–	95
290	–	–	90
300	–	–	85