

University of Mumbai

Examination 2020 under cluster 4 (PCE)

Program: BE Mechanical Engineering

Curriculum Scheme: Rev 2012

Examination: Third Year Semester V

Course Code: MEC504 and Course Name: Theory of Machines - II

Time: 1 hour

Max. Marks: 50

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Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	In a centrifugal clutch, the force with which the shoe presses against the driven member is _____.
Option A:	the ratio of centrifugal and spring force
Option B:	the difference between centrifugal and spring force
Option C:	the product of centrifugal and spring force
Option D:	the addition of centrifugal force and spring force
Q2.	When the clutch is engaged, the spring pressure clamps the friction plate between the pressure plate and _____.
Option A:	reaction plate
Option B:	clutch pedal
Option C:	flywheel
Option D:	differential
Q3.	For a rope brake dynamometer, the flywheel is cooled with soapy water because _____.
Option A:	entire energy is absorbed by the friction resistance of the brake
Option B:	entire Energy is used to do work
Option C:	Entire energy is provided by the motor
Option D:	entire energy supplied is more than the requirement
Q4.	A rope brake dynamometer falls under the category of _____.
Option A:	Mechanical friction type dynamometer
Option B:	Hydraulic dynamometer
Option C:	Transmission type dynamometer
Option D:	Torsion type dynamometer
Q5.	A hunting governor is _____.
Option A:	more stable
Option B:	less sensitive
Option C:	more sensitive
Option D:	less stable
Q6.	Which of the following is a pendulum type governor?
Option A:	Watt's governor
Option B:	Porter governor
Option C:	Hartnell governor
Option D:	spring loaded governor
Q7.	When the pitching of a ship is upward, the effect of gyroscopic couple acting on it

University of Mumbai
Examination 2020 under cluster 4 (PCE)

	will be _____.
Option A:	to raise the stern and lower the bow
Option B:	to move the ship towards port side
Option C:	to move the ship towards star-board
Option D:	to raise the bow and lower the stern
Q8.	The effect of gyroscopic couple on rolling of ship is _____.
Option A:	very high
Option B:	moderate
Option C:	very low
Option D:	no effect
Q9.	The main disadvantage of Sliding mesh gear box is _____.
Option A:	Noisy operation
Option B:	Wear and Tear of gears
Option C:	Reverse Gear not present
Option D:	Gear box gets jammed
Q10.	In which of the gear box all gears are always in contact?
Option A:	constant mesh
Option B:	sliding mesh
Option C:	synchromesh
Option D:	epicyclic
Q11.	The coefficient of fluctuation of speed is the _____ of maximum fluctuation of speed and the mean speed.
Option A:	difference
Option B:	sum
Option C:	ratio
Option D:	product
Q12.	Calculate the radius of gyration for dynamically equivalent system, when centre of gravity of connecting rod is at a distance of 200 mm from the small end and 250 mm from big end.
Option A:	0.466 m
Option B:	0.123 m
Option C:	0.313 m
Option D:	0.223 m
Q13.	If the air screw of an aeroplane rotates CW when seen from rear and takes right turn then gyroscopic effect will be _____.
Option A:	raise the nose and dip the tail
Option B:	dip the nose and raise the tail
Option C:	raise the nose and tail
Option D:	dip the nose and tail
Q14.	In which of the gear box sun and planet gear set is used?
Option A:	constant mesh

University of Mumbai
Examination 2020 under cluster 4 (PCE)

Option B:	sliding mesh
Option C:	synchromesh
Option D:	epicyclic
Q15.	A machine punching 38 mm holes in 32 mm thick plate requires 7 N-m of energy per sq. mm of sheared area. Find total energy required per hole.
Option A:	13.35 KN-m
Option B:	53.4 KN-m
Option C:	106.8 KN-m
Option D:	26.7 KN-m
Q16.	An automobile having single plate clutch and consisting a pair of contacting surfaces has inner and outer radii of friction plate to be 120 mm and 250 mm respectively. The coefficient of friction is 0.25 and total axial force is 15 kN. What is the torque transmitted by the clutch considering uniform pressure theory?
Option A:	1.083 kN-m
Option B:	2.658 kN-m
Option C:	0.458 kN-m
Option D:	6.478 kN-m
Q17.	In which of the following dynamometers does the entire energy or power produced by the engine is absorbed by the friction resistances of the brake?
Option A:	Prony brake dynamometer
Option B:	Torsional dynamometer
Option C:	Epicyclic train dynamometer
Option D:	Belt transmission dynamometer
Q18.	For a watt Governor 10 cm height corresponds to a speed of about _____.
Option A:	85 rpm
Option B:	87 rpm
Option C:	95 rpm
Option D:	102 rpm
Q19.	For the given data of an Internal combustion engine : Mass of parts = 180 kg, bore = 175 mm, length of stroke = 200 mm, engine speed = 500 r.p.m., length of connecting rod = 400 mm and crank angle = 60° from T.D.C, find the inertia force.
Option A:	17.56 KN
Option B:	18.5 KN
Option C:	19.2 KN
Option D:	20.2 KN
Q20.	A multi-plate disc clutch transmits 75 kW of power at 2000 rpm. Coefficient of friction for the friction surfaces is 0.2. If the axial load on friction surface is 2827.43 N and internal radius is 100 mm which is 0.8 times the external radius, assuming uniform wear conditions, find the number of plates needed to transmit the required torque.
Option A:	4
Option B:	3

University of Mumbai
Examination 2020 under cluster 4 (PCE)

Option C:	7
Option D:	5
Q21.	In band and block brake having 12 blocks, ratio of tensions is 2.75. The drum has a mass of 800 kg and effective radius of gyration is 0.6 m. If the angular retardation of the brake drum is 5.71 rad/s^2 , find the maximum braking torque.
Option A:	1004.24 N-m
Option B:	745.58 N-m
Option C:	1644.48 N-m
Option D:	1478.2 N-m
Q22.	In a Hartnell governor the ball arm and sleeve arm are of equal length .The sleeve mass is negligible and the ball mass is 1 kg .At an ball radius of 25 cm .The ball arm is vertical and the equilibrium speed is 20 rad/s. If the spring stiffness is 200 N/cm, what is the initial compression in the spring at this position?
Option A:	1 cm
Option B:	0.5 cm
Option C:	2 cm
Option D:	0.25 cm
Q23.	A motor car moving at a certain speed takes a left turn in a curved path. If the engine rotates in the same direction as that of wheels, then due to the centrifugal forces _____.
Option A:	the reaction on the inner wheels increases and on the outer wheels decreases
Option B:	the reaction on the outer wheels increases and on the inner wheels decreases
Option C:	the reaction on the front wheels increases and on the rear wheels decreases
Option D:	the reaction on the rear wheels increases and on the front wheels decreases
Q24.	The range of gear ratios in a vehicle depends upon _____.
Option A:	the ratio of engine h.p. to laden weight of vehicle
Option B:	maximum engine torque / weight of vehicle
Option C:	only on the laden weight of the vehicle
Option D:	the power to weight ratio of engine
Q25.	The crank-pin circle radius of a horizontal engine is 300 mm. The mass of the reciprocating parts is 250 kg. When the crank has travelled 30° from T.D.C., the difference between the driving and the back pressures is 0.45 N/mm^2 . The connecting rod length between centres is 1.2 m and the cylinder bore is 0.5 m. If the engine runs at 250 r.p.m. and if the effect of piston rod diameter is neglected, calculate the net load on piston.
Option A:	90560 N
Option B:	88000N
Option C:	88357 N
Option D:	78036 N

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Question	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	B
Q2.	C
Q3.	A
Q4	A
Q5	C
Q6	A
Q7	C
Q8.	D
Q9.	B
Q10.	A
Q11.	C
Q12.	D
Q13.	B
Q14.	D
Q15.	D
Q16.	B
Q17.	A
Q18.	C
Q19.	B
Q20.	C
Q21.	C
Q22.	A
Q23.	B
Q24.	B
Q25.	C