

Program: BE Mechanical Engineering

Curriculum Scheme: Revised-2012

Examination: Third Year Semester V

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

2909_R12_Mech_V_MEC504_QP

Time: 1hour

Max. Marks: 50

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

Q1.	While considering the effect of Gyroscopic couple on a 4-wheeler, track width is?
Option A:	Difference between radii of turning of outside and inside front wheels
Option B:	Distance between the front and rear axles
Option C:	Difference between radii of turning of outside and inside rear wheels
Option D:	Distance between the centers of two wheels on same axle
Q2.	In which of the gearbox sun and planet gear set is used?
Option A:	Constant-mesh gearbox
Option B:	Sliding mesh gearbox
Option C:	Synchromesh gearbox
Option D:	Epicyclical gearbox
Q3.	The frictional torque transmitted by a disc or plate clutch is same as that of
Option A:	flat pivot bearing
Option B:	flat collar bearing
Option C:	conical pivot bearing
Option D:	trapezoidal pivot bearing
Q4.	Which of the following statements is/are true? 1. Static force analysis does not consider inertia forces along with static forces 2. The SI unit of mass moment of inertia is kg/m ² 3. Mass moment of inertia of a thin disc about its diameter is given by $(mr^2) / 2$
Option A:	Only 1
Option B:	Only 2
Option C:	Only 3
Option D:	2 and 3
Q5.	Which of the following is an absorption type dynamometer?
Option A:	prony brake dynamometer
Option B:	epicyclic-train dynamometer
Option C:	torsion dynamometer
Option D:	rope brake dynamometer

Q6.	The engine of an aeroplane rotates in clockwise direction when seen from the tail end and the aeroplane takes a turn to the left. The effect of gyroscopic couple on the aeroplane will be?
Option A:	to dip the nose and tail
Option B:	to raise the nose and tail
Option C:	to raise the nose and dip the tail
Option D:	to dip the nose and raise the tail
Q7.	The controlling force in centrifugal governors is provided by
Option A:	Flyballs
Option B:	Sleeve
Option C:	Upper links
Option D:	Lower links
Q8.	Why are the helical gears used commonly in transmission over spur gears?
Option A:	Low cost and high strength
Option B:	Low noise level and high strength
Option C:	Low noise level and economy
Option D:	Low noise level and low cost
Q9.	Which of the following type of brakes can bring the member to an absolute rest?
Option A:	Hydraulic
Option B:	Electric
Option C:	Mechanical
Option D:	Fluid agitator
Q10.	The ratio of maximum fluctuation of speed to the mean speed is called
Option A:	Fluctuation of speed
Option B:	Maximum fluctuation of speed
Option C:	Coefficient of fluctuation of speed
Option D:	Minimum fluctuation on speed
Q11.	In a conical clutch, if W_n is the normal load acting on the friction surface, μ is the coefficient of friction and α is the semi cone angle then what is the axial force required for disengaging the clutch (W_d)?
Option A:	$W_n(\mu \cos \alpha + \sin \alpha)$
Option B:	$W_n(\mu \cos \alpha - \sin \alpha)$
Option C:	$W_n(\cos \alpha - \mu \sin \alpha)$
Option D:	$W_n(\cos \alpha + \mu \sin \alpha)$
Q12.	In an automobile, if the vehicle makes a turn, the gyroscopic torque
Option A:	Increases the force on outer wheels
Option B:	Increases the force on inner wheels
Option C:	Increases the force on rear wheels
Option D:	Increases the force on front wheels

Q13.	Height of a Governor is
Option A:	The distance between centre of two balls mass
Option B:	The distance between centre of balls to the point of intersection of upper arms on spindle axis
Option C:	The distance between centre of balls to the point of intersection of lower links on spindle axis
Option D:	The distance between point of intersection of upper arms on spindle to the point of intersection of lower arms on spindle axis
Q14.	Which one of the following is used to convert a rotational motion into a translational motion?
Option A:	Bevel
Option B:	Double Helical
Option C:	Rack and pinion
Option D:	Worm and worm wheel
Q15.	The difference between which two factors denotes the correction couple?
Option A:	Difference between force required to accelerate non dynamically equivalent system and dynamically equivalent system
Option B:	Difference between torque required to accelerate non dynamically equivalent system and dynamically equivalent system
Option C:	Difference between torque required to decelerate dynamically equivalent system and non dynamically equivalent system
Option D:	Difference between force required to decelerate non dynamically equivalent system and dynamically equivalent system
Q16.	In the expression for angle of heel Θ for 2-wheeler, the $\sin \Theta$ component is applied for which couple?
Option A:	Gyroscopic couple
Option B:	Centrifugal couple
Option C:	Balancing couple
Option D:	Centripetal couple
Q17.	In a conical clutch, considering uniform wear, if r_1 & r_2 is the outer and inner radius of friction surfaces respectively, α is the semi cone angle then total frictional torque acting on the clutch is given by, $T = n\mu WR$. What is R equal to?
Option A:	$\{2(r_1^3 + r_2^3) / 3(r_1^2 + r_2^2)\} \times \operatorname{cosec} \alpha$
Option B:	$\{2(r_1^3 - r_2^3) / 3(r_1^2 - r_2^2)\} \times \operatorname{cosec} \alpha$
Option C:	$\{(r_1 - r_2)/2\} \times \operatorname{cosec} \alpha$
Option D:	$\{(r_1 + r_2)/2\} \times \operatorname{cosec} \alpha$

Q18.	When the relation between the controlling force (F_c) and radius of rotation (r) for a spring controlled governor is $F_c = a.r - b$, (where a and b are constants) then the governor will be
Option A:	Stable
Option B:	Unstable
Option C:	Isochronous
Option D:	Highly sensitive
Q19.	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
Q20.	For isochronous, spring controlled governor, the controlling force with increase in radius of rotation
Option A:	Increases
Option B:	Decreases
Option C:	remains constant
Option D:	may increase or decrease depending on size of governor
Q21.	A fixed gear having 200 teeth is in mesh with another gear having 50 teeth. The two gears are connected by an arm. The number of turns made by the smaller gear for one revolution of arm about the centre of bigger gear is
Option A:	1
Option B:	2
Option C:	4
Option D:	3
Q22.	A multi-disc clutch has 3 discs on the driving shaft and 2 on the driven shaft. The outer radius is 120 mm and inside radius 60 mm. Considering uniform wear and $\mu = 0.3$, find the value of axial force, W for transmitting 25 kW at 1500r.p.m.
Option A:	1473.65 N
Option B:	999 N
Option C:	1240.23 N
Option D:	2019.32 N
Q23.	A circular solid disc of uniform thickness 20 mm, radius 200 mm and mass 20 kg, is used as a flywheel. If it rotates at 600 rpm, the kinetic energy of the flywheel, in Joules is
Option A:	395
Option B:	790
Option C:	1580
Option D:	3160

Q24.	Two governors A and B are operating for the same speed range. Governor A has more sleeve displacement for a fractional change in speed then which of the following is correct
Option A:	Governor A is more sensitive than Governor B
Option B:	Governor A is less sensitive than Governor B
Option C:	Governor A is more stable than governor B
Option D:	Governor A and governor B are equally sensitive
Q25.	A rear engine automobile is travelling along a track of 40meters mean radius at 72 kmph speed. Each of the four road wheels has a moment of inertia of 2 kg-m^2 and an effective radius of 0.2 m. The rotating parts of the engine have a moment of inertia of 1.5 kg-m^2 . The engine axis is parallel to the rear axle and the crankshaft rotates in the same sense as the road wheels. The ratio of engine speed to back axle speed is 4 : 1. Find the gyroscopic couple acting on the vehicle.
Option A:	2100 N-m
Option B:	700 N-m
Option C:	1400 N-m
Option D:	350 N-m