University of Mumbai
Online Examination 2020

Program: BE Mechanical Engineering	
Curriculum Scheme: Revised 2016	
Examination: BE SEM VIII R-2016	
Course Code:MEC801 and Course Name: design of Mechanical System	
Time: 1hour	Max. Marks: 50

Q Experimental Models are prepared in which phase
A Conceptual Design
B Embodiment Design
C Detailed design
D Planning for manufacture

Q Out of following which thing is not done in planning for manufacture
A Designing of specialized tools
B Design layout of production lines
C Establishment of standard time and labor costs
D Packing and shipping

Q Detailed design involves
A Problem defination
B Dimensioning and tolerencing of product
C Product architecture
D Concept generation

Q Which basic steps involves in Planning for distribution
A Quality and cost analysis of product
B Production plant layout design and time analysis
C Warehouse and shipment arrangements
D Concept generation

Following activities are required for production processes planning

A.Process sheet preparation

B.Design of tooling and fixture

C.Actual oroduction

D.Work schedule   Correct sequence isFollowing activities are required for production processes planning

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A.Process sheet preparation

Q	B.Design of tooling and fixture
A	A B C D
B	A B D C
C	D C B A
D	B C D A
Q	Which type of optimization problems gives infinite feasible solutions
A	Continuous
B	non continuous
C	Combinatorial
D	exponential
Q	The constarints which are desirable to satisfy are called as
A	soft constraints
B	heavy constraints
C	Hard Constraints
D	regular constraints
Q	In case of design of punching machine which is soft constraints
A	Number of predifined punches /sec
B	should punch on predefined thick plates
C	Should punch predefined material plate
D	low power consumption

Q Advertisement and promotion and Monitor initial sales etc are the functions of
A Conceptual Design
B Planning For distribution
C Detailed design
D Planning for manufacture

Q EOT Crane consists of movement of movement of material from ---
A one machine to another
B one shop to another another shop
C stores to shop
D one industry to another industry

Q If the wires in the strands are twisted in the same direction as the strands then such wire rope is called as
A Cross lay or regular lay
B Parallel lay or long lay
C Composite lay or reverse lay
D ordinery lay

Q In which type of wire rope larger diameter wires are placed along the peripheri of strand.
A Ordinery
B warrington
C Compound
D Simplex

Q Load per fall = (W+ Ws)/(n* ŋ) where W is lifting capacity, Ws is weight of snatch block assembly which can be taken as 0.1times lifting capacity, n are number of falls, and ŋ= efficiency can be taken as 90 %. If lifting capacity is 12 tonn, and four fall system then what is load per fall
A 3.6666 Tonns
B 4.6666 Tonns
C 2.7777 Tonns
D 5.6666 Tonns

Q For 4 bends of wire rope , Dmin/d= ……
A 23
B 25
C 21
D 20

Q Out of list which is part of snatch block assembly
A Shackle plate
B take up arrangements
C Impeller
D Suction pipe

Q in case of Four bends system if wire rope diameter is 24 mm then what should be diameter of pulley
A 560 mm
B 460 mm
C 600 mm
D 60 mm

Q Which sentnece is false for 6 X 19 cross lay rope

A	Six strands and 19 wires in each strand
B	Total wires in rope are 222
C	Wire rope is stable on pulley
D	twisting direction of wires is opposite to strand in rope
Q	In case of Eight fall system how many moving pulleys are coupled in snatch block assembly
A	2
B	3
C	4
D	5
Q	How many numbers of shackle plates are used in hoisting mechanism ?
A	5
B	4
C	3
D	2
Q	Which cross section gives cost saving in material of crane hook
A	circular
B	elliptical
C	trapezoidal
D	square
Q	in case of Six fall system if hoisting speed is 10 m/min then what should me peripheral speed of pulley
A	20 m/min
B	10 m/min
C	8 m/min
D	30 m/min
Q	Which type of bearing is used to attached pulley on the axle of hoisting mechanism ?
A	Thrust bearing
B	Roller bearing
C	Hydrodynamic bearing
D	Needle roller bearing
Q	Which of the following type of rope is made up of heavy wires and provides maximum resistance to wear and vibration
A	6*19
B	6*7
C	6*37
D	6*22
Q	Following is not the component of snatch block assembly
A	Crane Hook
B	Cross piece
C	Shackle plate
D	Rope drum
Q	What is the following correct meaing of wire rope 6*37?
A	6 Number of ropes and 37 number of wires in rope
B	6 Number of strands and 37number of ropes
C	6 number of strands and 37 Number of wires in each strands
D	6 Number of ropes and 37 number of strands in rope

Q In which of the following case size of crane hook is least
A 10 tonn capacity with mild steel material
B 10 tonn capacity with High tensile steel material
C 14 tonn capacity with mild steel material
D 14 tonn capacity with High tensile steel material
Q The failure of the hook nut is due to ---
A only shear
B only tensile
C only crushing
D both shear and crushing
Q Which portion of the steel wire ropes fail earlier?
A outer wires
B inner wires
C strands
D core
Q The regular lay ropes are so constructed that the direction of twist of wires --
A in the strand is opposite to that of the strands in the rope.
B in the strand is same as that of the strands in the rope.
C in two adjacent strands are twisted to the opposite direction.
D may be either right or left hand dirction.
Q Most critical cross-section of the hook is ------------ load axis.
A parallel to
B inclined to
C perpendicular to
D either parallel or incined to
Q Which of the following element has main body is rectangular while the ends ars modified in cylindrical form?
A Shackle plate
B Crosspiece
C hook
D Bearing
Q Which of the following is not the type of lays of wire rope ?
A Parallel
B Cross
C Composite
D Straight
Q For continuous supply of material in inplant handelling which type of material handelling equipement is prefered
A EOT crane
B Trucks
C Tractor mounted crane
D Conveyors
Q Which of the following is a component of belt conveyor?
A wire rope
B Troughing idler
C Impeller
D Cross piece

Q	Which is correct option for belt conveyor for net pull load calculation (P), Where Wo is resistance on top run and Wu is resistance on bottom run
A	P= Wo+ Wu
B	P= Wo / Wu
C	P= Wo* Wu
D	P= Wo (1+Wu)
Q	Angle of inclination of belt conveyor is limited up to
A	30 Deg with horizantal
B	Angle of repose of material with belt material
C	45 Deg with horizantal
D	60 Deg with horizantal
Q	Troughing angle is angle between
A	return idler and belt
B	Straight idler and troughing idler
C	top idler and conveyor center line
D	Belt and Driving pulley
	$W_o = CFL ((G_g+G_b)\cos \delta +G_{ro}) +/- H (G_g+G_b)$. In this formulla Plus sign indicates ....In belt conveyor system , resistance on the top run (kgf)
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Q	$W_o = CFL ((G_g+G_b)\cos \delta +G_{ro}) +/- H (G_g+G_b)$. In this formulla Plus sign indicates ....In belt
A	Conveying down
B	Conveying up
C	Conveying horizontal

D	Conveying inclined
Q	For slight improvement in angle of lap which pulley is used
A	Compensating pulley
B	Snub Pulley
C	Additional driven pulley
D	additional return roller
Q	What is the correct selection criterion of number of ply (i) ,If calculated value of number of ply (i) is more than imax ?
A	i<imax
B	i=imax
C	i=imin
D	i>imax
	Force= 8000N , V=1.25 m/s, Mechanial Efficiency =85 % and Adhesion factor is 20% extra power requirement. Calculate motor power of belt conveyor system.Where
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Q	Force= 8000N , V=1.25 m/s, Mechanial Efficiency =85 % and Adhesion factor is 20% extra power
A	11.34 Kw
B	14.11 KW
C	13.34 KW
D	14.34 KW
Q	In case of troughing roller load on each troughing roller is
A	40 % of total load
B	20 % of total load

C	15 % of total load
D	25 % of total load
Q	Working tension , kgf/mm width per ply of mechanical joints and gravity take up or vulcanized and screw take up for 32 oz is ....
A	0.57
B	0.66
C	0.77
D	0.98
Q	Dry Ash can not be conveyed beyond which angle of inclination of conveyor with horizantal
A	30 Deg
B	50 Deg
C	45 Deg
D	10 Deg
Q	Out of list which is a standred width of belt
A	250 mm
B	400 mm
C	350 mm
D	600 mm
Q	As per standards, allowable belt conveyor speeds in m/s for Dry and wet sand for 400 mm belt with is ......
A	2
B	2.25
C	2.75
D	3.75
Q	Engine is called as square engine when
A	$L > D$
B	$L < D$
C	$L = D$
D	$L = 1.5 D$
Q	For one complete cycle two stroke engine requires
A	One complete revolutions of cramkshaft
B	two complete revolutions of cramkshaft
C	Three complete revolutions of cramkshaft
D	Four complete revolutions of cramkshaft
Q	In case of Petrol engine compression ratio is maintained at
A	6 to 10
B	10 to 14
C	16 to 20
D	20 to 30
Q	in case of an engine if equivalence air fuel ratio ϕ is < 1 means
A	stoichiometric air fuel mixture
B	lean air fuel mixture
C	rich air fuel mixture
D	ordinery air fuel mixture
Q	The cubic capacity of a four strike engine spark ignition engine is 245 cc. the D/ L = 1.1 clearence volume is 27.2 cc, calculate length of stroke

A	7.7 cm
B	8.8 cm
C	6.3636 cm
D	7.2727 cm
Q	The mechanical efficiency of single cylinder four stroke engine is 80 %, the frictional power is estimated to be 25 KW then calculate Break power developed by engine
A	125 KW
B	25 KW
C	100 KW
D	150 KW
Q	A 42.5 KW engine has a mechanical efficiency of 85 %, find Frictional power
A	40 KW
B	7.5 KW
C	60 KW
D	15 KW
Q	A four stroke petrol engine at fullmload deliveres 50 KW power, it requires 8.5 KW power to rotate it without load at same speed. At full load brake thermal efficiency is 25 %, then indicated thermal efficiency at full load is
A	29.25%
B	45.76%
C	80.89%
D	67.43%
Q	CI engine fules are rated in terms of
A	Cetane number
B	Raynolds number
C	Octane number
D	avogadros number
Q	Cetane number of alpha methyl naphthalene is
A	0
B	30
C	60
D	100
Q	increasing the compression ratio in SI engine the knocking tendency
A	Decreases
B	increases
C	Not affected
D	reduced halved
Q	Indiacted power is directly proportional to
A	torque
B	air consumption
C	cooling inlet air
D	exhaust temperature
Q	At constant speed and constant air fuel ratio for an SI engine
A	BSFC is maximum at full load
B	BSFC is minimum at full load
C	BSFC is minimum at no load
D	BSFC doesn't depend on load

Q	In case of Two stroke SI engine Compression ratio is engine speed is 16000 rpm then number of cycles of engine are
A	8000
B	32000
C	12000
D	16000
Q	Spark plug is must in
A	Two stroke CI engine
B	Four stroke petrol engine
C	Four stroke four cylinder CI engine
D	Two stroke Four cylinder CI engine
Q	which is not a piston ring
A	Compression ring
B	wiper ring
C	needle ring
D	oil scarpper ring
Q	in which type of piston pin is free to rotate in small end of connecting rod and piston bosses
A	Semifloating pin
B	floating pin
C	fixed pin
D	urgent pin
Q	which type of valves are used in small automobiles
A	Sleeve valve
B	Poppet valve
C	Rotory valve
D	push valve
Q	which is not the part of piston length
A	Top land
B	Ring section
C	skirt
D	piston crown
Q	Number of piston rings are n = 0.4*√D , if bore diameter is 140 mm then how may piston rings are required
A	5
B	4
C	6
D	10
Q	Piston Crown thickness is given by formula tc= D* √((3*Pmax)/16*Sd)) if bour diameter is 120 mm, Pmax is 1.2 Mpa, Sd= 80 Mpa then find piston crown thickness
A	6.3639 mm
B	4.7645 mm
C	8.7612 mm
D	2.7865 mm
Q	Cylinder Liner thickness is given by t= (D/2)* ((√((Sd+0.4 Pmax)/(Sd-1.3 Pmax))-1) , if D=150 mm Sd= 100 Mpa, Pmax = 1.4 Mpa, determine linear thickness
A	0.5624mm

B	0.9036 mm
C	0.8765 mm
D	0.2436 mm
Q	Cylinder head thickness is given by tc = K2 * D * √(Pmax/Sd) , if K2= 0.54 , Pmax=1.8 Mpa, D = 120 mm, Sd= 100 Mpa then find cylinder head thickness
A	7.2448 mm
B	8.6938 mm
C	9.7685 mm
D	3.4536 mm
Q	An engine indicator is used to determine the following
A	Speed
B	Temperature
C	Volume of cylinder
D	MEP and IHP
Q	The brake power of a diesel engine, keeping other parameters constant, can be increased by
A	Decreasing the density of intake air
B	Increasing the temperature of intake air
C	Increasing the pressure of intake air
D	Decreasing the pressure of intake air
Q	The mechanical efficiency (ηm) of the engine is given by
A	B.P/I.P
B	I.P/B.P
C	(B.P × I.P)/100
D	(B.P × I.P)*100
Q	Gear pump is _____
A	Positive displacement pump
B	Rotodynamic pump
C	negative displacement pump
D	impulse pump
Q	identify rotodynamic pump
A	Gear pump
B	screw pump
C	centricugal pump
D	lobe pump
Q	identify component of centrifugal pump
A	cross piece
B	take up device
C	strainer and foot valve
D	crank
Q	out of list which is not type of impeller
A	Shrauded
B	semishrauded
C	open
D	vortex
Q	In case of centrifugal pump
A	flow velocity and absolute velocity at inelt are same

B	flow velocity is two times absolute velocity at inelt
C	flow velocity is three times absolute velocity at inelt
D	flow velocity is half of absolute velocity at inelt
Q	out of list which value is Lowest in case of centrifugal pump
A	total static head
B	static suction head
C	static delivery head
D	total manometric head
Q	In case of centrifugal pump manometric head is 40 m, whirl velocity at exit is 16.6 m/sec, peripheral speed at outlet is 25.67 m/sec then what is manometric efficiency
A	76.46%
B	82.87%
C	67.78%
D	92.08%
Q	if power supplied by motor to pump shaft is 8.67 KW, pump delivers 0.028 cubic meter/sec at manometric head of 28 m then determine overall efficiency of the pump.
A	94.76%
B	79.53%
C	88.70%
D	84.75%
Q	A centrifugal pump rotating at 1400 rpm, delivers 0.18 cubic meter/sec at head of 14 meter then specific speed of pump is
A	88.01
B	76.25
C	93.79
D	82.06
Q	a pump has manometric head capacity is 35 meters. It is required to pump a water from 70 meter deep well.then how many pumps should coupled in series or parallel
A	three pumps in series
B	three pumps in parallel
C	two pumps in series
D	two pumps in parallel
Q	What is the range of specific speed for Axial flow pump radial flow pump
A	10 to 30
B	30 to 50
C	80 to 160
D	160 to 500
Q	Priming is the process of
A	Filling air bubbles in casing of pump
B	Removel of air pockets from pump casing
C	repair of discharge valve
D	cleaning of foot valve
Q	If applied speed is toohigher than designed then what happens with centrifugal pump
A	pump stops working
B	pump fails to start
C	pump gives less efficiency
D	pump wont work at its capacity

Q Out of list which is a component of gear pump
A Impeller
B foot valve
C Gears
D Involute casing

Q in case of gear pump which shaft is heavely loaded
A both shat are equally loaded
B driving shaft
C driven shaft
D shaft connected to motor

Q In which of the gearbox overall reduction ratio remains constant
A Constant-mesh gearbox
B Sliding mesh gearbox
C Synchromesh gearbox
D Epicyclical gearbox

Q in which type of stepped progression rule diffrence between successive speed steps is constant
A Arithmetic progression
B Geometric progression
C Harmonic progression
D Logarithmic progression

Q As per standered references what is the range for range ratio is specified for Grinding machine
A 40 to 50
B 15 to 30
C 30 to 50
D 1 to 10

Q Geometric progression is prefered in case of machine tool gear box design because it gives
A Constant speed ratio for successive speed steps
B variable diameter ratio in each step
C Constant diameter diffrence
D Constant loss of Productivity

Q This data refered to 12 speed gear box N1 =60 , Nz=1000 , Z =12 , V=20 m/min considering arithmatic progression determine constant diffrence between speed steps
A 117.5
B 128.1818
C 85.4545
D 156

Q This data refered to 12 speed gear box N1 =60 , Nz=1000 , Z =12 , V=20 m/min considering geometric progression determine step ratio
A 1.4218
B 1.6745
C 1.2914
D 1.8745

Q out of list which is not a standered step ratio

A	1.06
B	1.12
C	1.26
D	1.42
Q	for heavy duty machine tool which standered step ratio is suggested
A	1.06
B	1.12
C	1.26
D	1.41
Q	for medium size general purpose machine tool which standered step ratio is suggested
A	1.06
B	1.12
C	1.26
D	1.41
Q	In case of machine tool gear box design if i max is 1.85 and i min = 0.32 then group ration is equal to
A	4.1428
B	0.5075
C	0.9825
D	5.7813
Q	If structural formula is written like 3(1) 2(3) 2(6) then how many speed steps are obtained
A	9
B	6
C	12
D	4
Q	How many possible structural formulae can be written for 9 speed gear box
A	2
B	4
C	8
D	1
Q	if transmission group is denoted by 2 (3) the meaning is
A	two speed steps
B	three speed steps in spacing of two speed steps in consicutive speeds
C	two speed steps in spacing of three speed steps in consicutive speeds
D	total six speed steps
Q	In case of ray diagram all output spindle speeds are reflected on
A	first verticle line
B	last verticle line
C	lowest horizantal line
D	upper horizantal line