Total No. of Questions: 6

Total No. of Printed Pages:3
Enrollment No.....



Faculty of Engineering

End Sem (Odd) Examination Dec-2022 BC3ES06 Basic Mechanical Engineering

Programme: B.Sc.(CS) Branch/Specialisation: Computer

Science

Duration: 3 Hrs. Maximum Marks: 60

	-	estions are compulsory. Interr should be written in full instea	nal choices, if any, are indicated. Answe	ers of
Q1	i.	is the resistance of a material to plastic deformation by indentation.		
		(a) Toughness (b) Res	ilience (c) Hardness (d) Stiffness	
	ii.	Modulus of Elasticity depend	ls on-	1
		(a) Stress	(b) Strain	
		(c) Applied force	(d) None of these	
	iii.	Entropy is a-		1
		(a) Path function, intensive pr	roperty	
		(b) Path function, extensive p	roperty	
		(c) Point function, intensive p	roperty	
		(d) Point function, extensive J	property	
	iv.	Which of the following is true	e for a closed system?	1
		(a) Mass entering = mass leav	ring	
		(b) Mass does not enter or leave the system		
		(c) Mass entering can be more or less than the mass leaving		
		(d) None of these		
	v.	Which one is a part of four stroke diesel engine?		
		(a) Ports (b) Spark Plug	(c) Camshaft (d) None of these	
	vi.	Which one is a link between piston and crank?		
		(a) Connecting rod	(b) Push rod	
		(c) Crankshaft	(d) Flywheel	
	vii.	Which of the following equipment is a boiler accessory?		
		(a) Blow off cock	(b) Water level indicator	
		(c) Safety valve	(d) Economiser	

P.T.O.

- viii. Which one of the externally fired boiler? (a) Babcock and Wilcox (b) Lancashire (c) Cochran (d) None of these Centre of gravity of a thin hollow cone lies on the axis of symmetry at 1 a height of-
- - (a) One-half of the total height above base
 - (b) One-third of the total height above base
 - (c) One-fourth of the total height above base
 - (d) None of these
- What will be the radius of gyration of a circular plate of diameter 1 10 cm?
 - (a) 10 cm
- (b) 5 cm
- (c) 2.5 cm
- (d) None of these

1

6

6

Determine the taper angle ' θ ' of a workpiece as shown in figure 1. if 4 Q2 the two precision rollers have radii 8 mm and 5 mm and the total thickness of slip gauge inserted between the rollers is 15.54 mm.

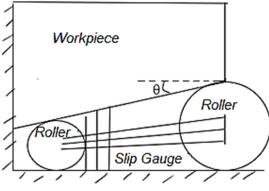
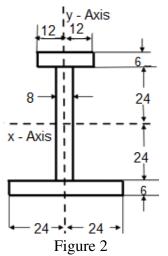


Figure 1

- Draw and explain stress-strain curve for mild steel bar under tensile testing.
- OR iii. Define the following material properties: hardness, toughness, elasticity, plasticity, ductility and creep.
- A gas contained in a cylinder is compressed, the work required for 4 Q.3 i. compression being 5000 kJ. During the process, heat interaction of 2000 kJ causes the surrounding to be heated. Calculate the changes in internal energy of the gas during the process.
 - State Second law of thermodynamics. Explain its importance.
- iii. Explain various desirable properties of refrigerants. OR

- Q.4 i. Write the function of the following:
 - (a) spark plug (b) piston pin (c) piston rings and (d) flywheel in an engine.
 - With the help of a neat diagram explain the working of four stroke 6 diesel engine.
- Compare two stroke and four stroke internal combustion engines. OR
- A boiler is having a chimney of 35 m height, the draught produced in 4 Q.5 i. terms of water column is 20 mm. the temperature of flue gas inside the chimney is 365°C and that of air outside the chimney is 32°C. Calculate the mass of air used.
 - Write the function of following mountings in a boiler-
 - (a) Blow off cock
- (b) Water level indicator
- (c) Fusible plug
- (d) Steam stop valve
- OR iii. Write the differentiate between-
 - (a) Water tube boiler and fire tube boiler
 - (b) Externally fired boiler and internally fired boiler
- Derive an expression for moment of inertia of a triangular section 4 O.6 i. (with base 'b' and height 'h') about an axis passing through its base.
 - Determine moment of inertia about X -Axis for a beam that has the 6 following cross-sectional area as shown in figure 2. All dimensions are in mm.



State & prove parallel & perpendicular axis theorem. OR

24/12-(1)

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Note: Q.1 (N	All qu ICQs)	uestions are compulsory. Internal choices, if any, are indicated. Answers) should be written in full instead of only a, b, c or d.	3 (
Q1	i.	is the resistance of a material to plastic deformation by	1
		indentation.	
		(a) Toughness (b) Resilience (c) Hardness (d) Stiffness	
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	iv.	Which of the following is true for a closed system?	1
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		(b) surely runs	

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Q.4 i.

engine.

(a) Bab (c) Coc ix. Centre (a) height (a) One (b) One (c) One (d) Non x. What w	of gravity of a thin hollo	(b) Lancashire (d) None of the w cone lies on the ax above base above base at above base	ese is of symmetry at	
radius of $=\frac{r}{\sqrt{2}}$ (a) 10 cm	m (b) 5 cm	(e) 2.5 cm	(d) None of these	
the two	ne the taper angle 'θ' of precision rollers have s of slip gauge inserted l	radii 8 mm and 5 m	m and the total	4
2 5+8+1554	Workpiece B m m	θζ Roller	10	
0=120	11111	lip Gauge) 5mm	1 3mm
testing.	l explain stress-strain cu	rve for mild steel bar		6.
elasticity,	plasticity, ductility and	creep.		6
$\approx 40 + 400$ compress: $\approx 3000 \text{ kJ c}$ internal en	ntained in a cylinder is ion being 5000 kJ. Dur auses the surrounding to nergy of the gas during to and law of thermodynam	ing the process, hear be heated. Calculate the process. Av = 30	t interaction of the changes in	4
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		-500		U

		ongme.
	ii.	With the help of a neat diagram explain the working of four stroke 6 diesel engine.
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Q.5	i.	A boiler is having a chimney of 35 m height, the draught produced in terms of water column is 20 mm. the temperature of flue gas inside the chimney is 365° C and that of air outside the chimney is 32° C Calculate the mass of air used. $M = 16.9$ kg/kg of fuel
	ii.	Write the function of following mountings in a boiler- (a) Blow off cock (b) Water level indicator (c) Fusible plug (d) Steam stop valve
OR	iii.	Write the differentiate between- (a) Water tube boiler and fire tube boiler
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Q.6	i. ii.	Derive an expression for moment of inertia of a triangular section 4 (with base 'b' and height 'h') about an axis passing through its base. Determine moment of inertia about X -Axis for a beam that has the following cross-sectional area as shown in figure 2. All dimensions are in mm.
A1 = :	24×6 3+56 48×	$y - Axis$ $\hat{y} = \frac{(144 \times 57 + 384 \times 30 + 288 \times 3)}{(144 + 384 + 288)}$ $8 = 384 \text{ mm}^2$ $8 = 288 \text{ mm}^2$ $8 - 268 \text{ mm}^2$
y22 A32	300	$\frac{24}{6} = 288 \text{ mm}^2$ $\frac{24}{4} = \frac{816}{4}$ $\frac{7}{4} = \frac{25}{23}$
y3 =	3 W	1 24 I _{Kx} = 37/427 mm ^M
		24-1-24-
OR i	iii. S	Figure 2 State & prove parallel & perpendicular axis theorem.
1		
(- ?):	12	$\frac{63}{12} + (57 - 25.23) \times 10^{-12} + 384 \times (30 - 25.20)$