Question Paper

Exam Date & Time: 05-Jun-2018 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
II SEMESTER B.Sc.(Applied Sciences) DEGREE MAKE UP- EXAMINATION - MAY / JUNE 2018
DATE: 5 JUNE 2018
TIME : 9.30 AM TO 12.30 PM
Basic Mechanical Engg. [IME 122]

Marks: 100 **Duration: 180 mins.**

Answer 5 out of 8 questions.

Draw neat and proportionate sketches wherever necessary.
Missing data ,if any, may be suitably assumed.
Use of steam tables is permitted.

1)	A)	List the differences between a fire tube boiler and water tube boiler	(8)
	B)	A dry saturated steam at a pressure of 16 bar is generated in a boiler.Dry saturated steam leaves the boiler to enter a super-heater. In the pipe line it looses heat equal to 600 KJ/kg. In the super heater, steam is superheated to temperature of 380^{o}C. If temperature of feed water is 30^{o}C, determine: Total heat supplied to feed water in the boiler Dryness fraction of steam at the entry of super-heater Total heat supplied in the super-heater.	(12)
2)	A)	With neat sketch explain the working principle of Pelton Wheel	(10)
	B)	List the differences between two stroke and four stroke Engines	(10)
3)	A)	A single cylinder four stroke petrol engine develops indicated power of 7.5 kW. The mean effective pressure is 6.6 bar and the piston diameter is 100 mm. Calculate the average speed of the piston.	(4)
	B)	Explain with neat sketch the working of simple Carburetor	(10)
	C)	What are the desirable properties of good lubricant ? Explain.	(6)

4)	A)	With the help of block diagrams and T-h diagram, explain the working principle of vapour compression refrigeration system	(8)
	B)	A 4 cylinder 4 stroke I.C engine develops an I.P of 50 kW at 25 cycles /second. The stroke of the engine is 90 mm and bore is 0.8 times the stroke. A) Find the mean effective pressure in each cylinder. B) If mechanical efficiency is 80%, what effective brake load would be required if the effective brake drum circumference is 1m?.	(6)
	C)	Give reasons for the following i) The pulleys carrying flat belt are crowned. ii) Two water level indicators are used in a boiler iii) A 4 stroke engine can not run in reverse direction but a 2 stroke engine can. iv) Low voltage and high current is required in resistance welding	(6)
5)	A)	Explain with the help of block diagram the working principle of nuclear power plant.	(10)
	B)	A flat belt is required to transmit 35 KW from a pulley of 1.5m diameter running at 300 rpm. The angle of contact is 160^0 and the coefficient of friction between the belt and the pulley is 0.3. Determine the tight and slack side tension in the belt drive.	(4)
	C)	List the differences between soldering and welding	(6)
6)	A)	With neat sketch explain the following nomenclature of spur gear Pitch circle, addendum , face, face width, tooth thickness and clearance.	(10)
	B)	Write note on pattern allowances	(10)
7)	A)	The shaft from the motor is connected to gear A and rotates at 950 rpm. Gear B and C is compound gear as well as D and E. Gear A meshes with gear B and gear C drives gear D. The gear E meshes with gear F which is fixed on output shaft. Determine speed of gear F. Number of teeth on gear A,B,C,D,E,F are 20,50,25,75,25,65 respectively. Sketch arrangement and find the velocity ratio of the gear train.	(6)
	B)	With neat sketch explain the working principle of metal arc welding process	(10)
	C)	Distinguish between	(4)

i) Upsetting operation and drawing operation
ii) Sledge hammer and set hammer

8) Explain the taper turning process by swiveling the compoundin lathe (10)

A)

B) List the applications of following elements (at least two for each) (10)

1. Stainless steel 2. Copper 3. High speed steel 4. Tin
5. Lead 6. magnesium 7. Silver 8. Gold 9. Aluminium
10. Zinc

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