Enrollment No……

Bachelor of Engineering
Third Semester Main Examination, Dec-2020
Material Science [ES-220]
Branch-ME

Time: 3:00 Hrs **Max Marks 70**

Note: (i) Attempt any five questions. All question carry equal marks.
(ii) Answer should be precise & to be point only.
(iii) Assume suitable data if necessary & state them clearly

Q.1 Differentiate metals and nonmetals in terms of their properties and uses?

Q.2 What is atomic packing factor? Calculate the atomic packing factor of simple cubic, BCC and FCC crystal.

Q.3 Explain the concepts of lattice, basis and crystal structure? How are they related?

Q.4 What are defects? Discuss point and line defects in crystal with neat sketch.

Q.5 Define cold working and outline the change of properties due to cold working. Enlist its advantages and disadvantages of cold working?

Q.6 Describe the working of Iron carbon diagram with its advantages and limitations?

Q.7 Explain the following heat treatment process:-
(i) Normalizing
(ii) Annealing
(iii) Spherodizing
(iii) Tempering

Q.8 Discuss about the toxic and oxidizer materials also explain their classification and hazards?

Enrollment No……

Bachelor of Engineering
Third Semester Main Examination, Dec-2020
Communication Skills (HU220T)
Branch-CE/EE/EC/CS/IT/ME

Time: 3:00 Hrs **Max Marks 70**

Note : (i) Attempt any five questions. All questions carry equal marks.
(ii) Answer should be precise & to be point only.
(iii) Assume suitable data if necessary & state them clearly

Q.1 **(a) What is communication? Explain importance of communication in detail?**
(b) What are different barriers to communication and how will you eliminate them?

Q.2 **(a) How are non-verbal communication in an online environment?**
(b) What do you mean by communication styles? Explain.

Q.3 **(a) Define cycle of communication. Discuss the role of feedback in the cycle of communication.**
(b) What do you mean by encoding & decoding of the message? What is the role of source and receiver in communication?

Q.4 **(a) What are some examples of non-verbal signals that we convey in communication with other peoples?**
(b) What is the importance of studying non-verbal communication?

Q.5 **(a) Discuss the level of communication.**
(b) What are the different challenges in communication?

Q.6 **(a) What is paralinguistic features of communication.**
(b) What is volume in paralinguistics?

Q.7 **(a) What is proxemics in non-verbal communication?**
(b) Discuss the features importance to make an oral presentation effective.

Q.8 **Write short notes on-** **(Marks=14)**
(a) Feedback
(b) Semantic barriers
(c) Voice modulation
(d) Gesture.

Enrolment No……

Bachelor of Engineering
Third Semester Main Examination, Dec-2020
Strength of Materials [ME-221]
Branch-ME

Time: 3:00 Hrs **Max Marks 70**

Note: Attempt any five questions. All question carry equal marks.

Q.1 (a) Explain the terms strain, Shear strain, young's modulus and modulus of rigidity.
(b) A tension bar taper from (d+a) diameter to (d-a) diameter. Prove that the error involved in using the mean diameter to calculate the young modulus is (10a/d)^2 percent.

Q.2 (a) A closed coiled helical spring has its free length as 120mm it absorbs 40 N-m of energy when fully compressed and the coil are in contact. The mean coil diameter is 80mm. Determine the diameter of steel wire required and number of coil, if maximum shear stress is to be 120MPa, G=80GPa.
(b) A 280mm*120mm*10mm I beam in to be used as a cantilever of 3.6 m length. Find the uniformly distributed load which can be carried safety if the permissible stress is 125 MPa.

Q.3 (a) What is the assumption made in the theory of torsion?
(b) Develop an expression for strain energy in a shaft subjected to torsion.

Q.4 (a) What do you mean by Theories of failure? What is their importance?
(b) What is meant by equivalent length of columns? What are its values for different end conditions of column?

Q.5 (a) Derive the equation for principal stresses from a given two dimensional stress element.
(b) Derive the relation.

$$\frac{\sigma}{Y} = \frac{M}{I} = \frac{E}{R}$$ for Simple Bending.

Q.6 (a) Deduce an expression for allowable tungsten moment of a thin walled tube. Also find an approximate Expression for strength weight ratio of such tube.
(b) Derive the expression of stresses and deflection of helical spring of circular wire.

Q.7 (a) Derive Euler's formula for column with pinned ends.
(b) Briefly explain true stress and true strain.

Q.8 (a) Briefly describe the construction of leaf spring with neat sketch.
(b) A shaft transmits 280 KW of power at 160 rpm. Determine the diameter of solid shaft to transmit the power.

Enrollment No……

Bachelor of Engineering
Third Semester Main Examination, Dec-2020
Theory of Machines & Mechanism (ME222T)
Branch-ME

Time: 3:00 Hrs **Max Marks 70**

Note: (i) Attempt any five questions.
(ii) All question carry equal marks.

Q.1 **(a) What is machine? Explain the sub division of Theory of machine.**
(b) Explain the Kutzbach equation and how it is transform to Grublers equation?

Q.2 **(a) Explain the four bar mechanism and their inversions with suitable application?**
(b) Define the Grashoff's law and their feasibility in four bar mechanism?

Q.3 **(a) What is Gear? Also explain classification of Gears according to the axes of shaft connected?**
(b) What is Kinematic pair? And also explain classification of the Kinematic pair?

Q.4 **(a) Distinguish between flat belt and V belt on the basis of power transmitted, space, grip and application?**
(b) Define gyroscopic couple? Explain gyroscopic effect on naval ships?

Q.5 **(a) What is law of gearing? Define relative velocity of sliding of gearing?**
(b) What is the condition for correct steering? Enlist main type of steering mechanism with neat sketch.

Q.6 **(a) Derived an equation for minimum number of teeth required on Pinion/Gear in order to avoid interference?**

(b) Prove Kennedy's theorem and three instantaneous center shared by three bodies in relative motion to one another.

Q.7 **(a) Drive an expression for the ratio of driving tension in the rope drive, assuming that the angle of the grove of the pulley to be 2B.**

(b) With neat sketch explain the term interference and undercutting between two mating gears?

Q.8 **Define the following terms (Any four)**

- **(i) Kinematic chain**
- **(ii) Degree of freedom or mobility**
- **(iii) Pitch circle**
- **(iv) Module**
- **(v) Length of path of approach**
- **(vi) Mechanism**

Enrollment No……

Bachelor of Engineering
Third Semester Main Examination, Dec-2020
Thermodynamics (ME223T)
Branch-ME

Time: 3:00 Hrs **Max Marks 70**

Note : (i) Attempt any five questions out of eight.
(ii) Answer should be precise & to be point only.
(iii) Assume suitable data if necessary & state them clearly

Q.1 **(a) What do you mean by thermodynamic equilibrium? 7**
(b) Discuss about the ZEROTH law of thermodynamic and explain with diagram. 7

Q.2 **(a) Differentiate between the properties and work of the system. 7**
(b) What do you mean by the properties of the system? Explain with example. 7

Q.3 **(a) A gas expands in a frictionless piston-cylinder arrangement the expansion process is very slow, and is resisted by an ambient pressure of 100 kpg. During the expansion process, the pressure of the system (gas) remains constant at 300 kpg. The change in volume of the gas from $0.01m^3$ to $0.03m^3$.Calculate the maximum amount of work that could be utilized from the above process? 7**

(b) Write the degree of freedom at triple point of water and derived according to GIBBS PHASE RULE. 7

Q.4 **(a) Drive an expression for work done in a closed system for all process. 7**
(b) What is macroscopic and microscopic approach for the study of motion of the particle? 7

Q.5 **(a) Explain the first law of thermodynamics.** **7**

(b) What do you mean by specific heat of the substance? Also proved- $C_p - C_v = R$ **7**

Q.6 **(a) Explain the CARNOT cycle with diagram.** **7**

(b) Explain the reversible and irreversible process with a suitable example. **7**

Q.7 **(a) State the second law of the thermodynamics with sketch.** **7**

(b) Two iron boxes are joined together in a process, before joining each boxes having temperature 300k and mass of the boxes are 2kg and 3kg respectively. Calculate the entropy change of the universe of specific heat of the both box are consider as 0.967 kj/kgk. **7**

Q.8 **(a) Heat is transferred to a heat engine form a furnace at a rate of 90MW. If the rate of waste heat rejection to nearby river is 55MW, determine the net power output and the thermal efficiency for this heat engine.** **7**

b) In a gas turbine the gas enters at the rate of 5kg/s with a velocity of 50 M/s and enthaspy of 900 kj/kg and leaves the turbine with a velocity of 150 m/s and enthalpy of 400 kj/kg. The loss of heat from the gases to the surrounding is 25 kj/kg. Assume for gas R=0.285 kj/kgk and c_p=1.004 kj/kgk and the inlet conditions to be at 100 KP_g and 27°C. determine the power output of the turbine and the diameter of the inlet pipe. **7**

Enrollment No……

Bachelor of Engineering
Third Semester Main Examination, Dec-2020
Manufacturing Process (ME224T)

Time: 3:00 Hrs **Max Marks 70**

Note: **1. Attempt any five questions out of eight.**
2. Answer should be precise & to be point only.
3. Assume suitable data if necessary & state them clearly.

Q.1 (a) What are the basic rules to be following for good casting design? (7)
(b) Define the following pattern with neat sketch
i) Split Patterns ii) Sweep Pattern
iii) Shell Pattern iv) Skeleton Pattern (7)

Q.2 (a) Explain machines used in pattern making ? (7)
(b) Explain the types of moulding band? (7)

Q.3 (a) Why the welded joint is in tension and weld should be peened with a hammer? (7)
(b)Which welding process can be used to weld two steel parts without melting them or without adding filler material? (7)

Q.4 (a) Calculate the gating dimensions with a gating ration of 1:2:2 for a ductile iron casting of section thickness 12mm weighing 30kg. Assume a spruce height of 200mm. (7)
(b) Explain advantages of welding over other joints? (7)

Q.5 (a) How forging operations are important in Manufacturing process explain with neat sketch Droving, upsetting and impression die or closed die forging. (7)
(b) Explain Various steps involved in drop forging? (7)

Q.6 (a) Explain principle of rotary forging with neat sketch? (7)
(b) Compare mechanical press with a hydraulic press. (7)

Q.7 It is required to punch a hole of 10mm diameter in a mild steel plate of 10mm thickness determine whether it is possible to punch hole I sheet having shear strength of 60 kg/mm^2 and compressive strength of punch is 200 kg.mm^2. It is not possible than what could be done to produce this hole? (14)

Q.8 Explain any four.
(a) Difference between Hot and Cold Rolling (3.5)
(b) Electro. Discharge Machining (EDM). (3.5)
(c) Hydro forming. (3.5)
(d) Ultra-Sonic Machining (USM) (3.5)
(e) Laser Beam Machining (LBM) (3.5)
(f) Surface Integrity (3.5)