Code No: 14559/CBCS/BL

FACULTY OF ENGINEERING

B E IV - Semester (CBCS) (Civil) (Backlog) Examination, October 2021

Subject: Surveying-II

Time: 2 Hours **Max Marks: 70**

(Note: Missing data, if any, may be suitably assumed)

PART - A

Answers any five questions. **(5x2=10 Marks)**

1. What is EDM and write its working principle
2. What are the temporary adjustments of a theodolite?
3. Explain briefly about trigonometrical leelling
4. How do you adjust the traverse by transit rule?
5. Define the degree of a curve by chord definition
6. Define sight distance along a sag vertical curve?
7. What do you understand by a transition Curve?
8. Define stereoscopy
9. List out various types of vertical curves
10. Illustrate applications of GIS in Surveying?

PART - B

Answers any four questions. **(4x15=60 Marks)**

11. a) Draw a schematic diagram of Theodolite and indicate its component parts with fundamental lines.
    b) Discuss in detail about measurement of horizontal angle by repetition method using direct angle in Theodolite survey

12. a) Determine the RL of Q from the following reciprocal trigonometric observations:
    Angle of elevation from P to Q = 01o 41’03”
    Signal Height at Q=3.44m
    Height of instrument at P=1.65m
    Distance between P and Q=17Km
    R Sin 1” = 30.96m
    RL of P=4251.13m
    Coefficient of refraction = 0.07
    Assume any missing data suitably
    b) Derive an expression for determination of phase of a wave?

..2

13. a) Two straights BA and BC are intersected by a line EF. The angles BEF are 1400 and 1450, respectively. The radius of the first arc is 600 m and that of the second is 400m Find the chainages of the tangent points, and the point of compound curvature, given that the chainage of point A is 3415 m.
    b) What is meant by Elements of Transition curve?

14. a) How do you set a simple curve by offsets from long chord?
    b) What are the conditions of closed traverse? Write in detail uses of Gale's Traverse table.

15. a) Calculate the setting out data of a vertical curve based based on the following data collected from surveying. Proposed length of the vertical curve (L) = 290m A descending gradient (-gl) of 3.2% meets another ascending gradient (+g2) of 2.2%. Chainage at the vertical point of intersection (I) = 980.00m RL of vertical point of intersection (I) = 150.00m Peg interval (PI) = 30m.
    b) List out different types of Total Station? Also write the applications of Total Station.

16. a) Three were two point are the ground as P and Q which are having elevations of 610 and 445m respectively, above the MSL. The focal length of the camera is 20cm and the flying height above the MSL was 2900m. Their corresponding photopraphic coordinates are detailed. Determine the ground coordinated and the horizontal distance between the PQ?

Corresponding Point on the Photograph	Photographic coordinates	
	X (cm)	Y (cm)
P	+2.15	+1.26
Q	-1.72	+3.15

    b) Explain the components of GIS with a sketch showing its block diagram

17. Write notes on any two of the following
    a) Electronic Theodolite
    b) Effect of Curvature
    c) Elements of Transition curve
    d) Applications of IRS

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Code No: 14566/CBCS/BL

FACULTY OF ENGINEERING

B.E IV – Semester (EEE) (CBCS) (Backlog) Examination October, 2021

Subject: Power System-I

Time: 2 Hours **Max. Marks: 70**

(Note: Missing data, if any, may be suitable assumed)

PART–A

Answer any five questions. **(5 x 2 = 10 Marks)**

1. Define load curve & load duration curve.
2. Explain Skin effect.
3. What are the various methods to improve string efficiency?
4. Explain the working principle of solar energy system.
5. Define hydrograph.
6. What is the effect of ice and wind on Sag?
7. What is two-part tariff?
8. Explain about self GMD and mutual GMD.
9. What are the essential components of flat plate collector?
10. What are the different methods of nuclear waste disposal?

PART–A

Answer any four questions. **(4 x 15 = 60 Marks)**

11. (a) What considerations have to be kept in view in siting nuclear power plants?
    (b) How can solar energy be converted to electrical energy? Give a diagram showing the elements of such plant.
12. (a) What are solar concentrators? Describe various components of solar concentrator and discuss its advantages.
    (b) Explain with neat sketches, the principle of operation of wind power plant.
13. Derive an expression for line to neutral capacitance for 3 phase unsymmetrical spaced transposed transmission lines.
14. Each line of a 3-phase system is suspended by a string of 3 identical insulators of self inductance C farad. The shunt capacitance of connecting metal work of each insulator is 0.2C to earth and 0.1C to line. Calculate the string efficiency of the system if a guard ring increases the capacitance to the line of metal work of the lowest insulator to 0.3C.
15. (a) Explain different types of tariffs.
    (b) Explain depreciation by sinking fund method.

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16. Explain in detail about working of thermal power plant with neat diagrams.
17. Write in detail about the following (i) ring mains system (ii) three-part tariff (iii) Francis and Kaplan turbine.

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Code No: 14569/CBCS/BL

FACULTY OF ENGINEERING

BE (EIE) IV – Semester (CBCS) (Backlog) Examination, October 2021

Subject: Transducer Engineering

Time: 2 Hours **Max. Marks: 70**

(Note: Missing data, if any, may be suitably assumed)

PART – A

Answer any five questions. **(5x2=10 Marks)**

1. Define Ruggedness and repeatability
2. Explain the Seebeck, Peltier effects used with thermo couples
3. Write basic electrical requirements of transducers
4. Mention the principle of capacitive proximity sensor
5. How is humidity measured using resistive principle
6. Differentiate between transducers and inverse transducers
7. Briefly state the principle of LVDT
8. What are the different types of Non-Electrical type pressure sensors?
9. Compare flat and corrugated diaphragms
10. How is Knudsen gauge used for measuring pressure?

PART- B

Answer any four questions. **(4x15=60 Marks)**

11. Explain the various Static Characteristics of measuring system

12 a) What are the possible errors that may occur in bonded strain gauges and how can they be minimize
   b) Explain the construction and working of bonded strain gauge

13 Explain the basic principle of variable capacitive transducer. With a neat diagram explain the variable capacitive proximity sensor

14 a) Discuss the means for the calibration of temperature measurement?
   b) Explain the laws used to study the behavior of thermo couple?

15. Using suitable waveforms explain LVDT. Also explain the similar transducer for angular measurement of displacement?

16. Explain
   a) Different standard test signals with equations
   b) Define (i) Linearity (ii) Hysteresis (iii) Span (iv) Calibration

17. Explain the construction and working of a platinum resistance thermometer.

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Code No. 14575/CBCS/BL

FACULTY OF ENGINEERING

B.E. IV - Semester (CBCS) (ECE) (Backlog) Examination, October 2021

Subject: Probability Theory & Stochastic Process

Time: 2 Hours **Max. Marks: 70**

(Note: Missing data, if any, may be suitably assumed)

PART – A

Answer any five questions. **(5x2 = 10 Marks)**

1 Define classical and relative frequency definitions of probability, also write axioms.

2 A Missile can be accidentally launched if two relays A and B both have failed. The probabilities of A and B failing are known to be 0.01 and 0.03, respectively. It is also known that B is more likely to fail if A has failed with probability 0.06, then
(i) What is the probability of an accidental missile launch?
(ii) What is the probability that A will fail if B has failed?

3 The probability distribution table of a discrete random variable is given by

x	0	1	2	3	4	5	6
P(x)	K	3K	5K	7K	9K	11K	13K

Find (i) $P(X \leq 4)$ (ii) $P(3<X \leq 6)$.

4 If X is a Poisson's random variable such that P(X=3) = P(X=4), then find P(X=6).

5 Define co-variance and write any two properties.

6 Find the marginal density functions of given joint density function.

$$f_{XY}(x,y) = 2\exp\left[-4y - \frac{x}{2}\right]u(x)u(y).$$

7 Define Random process and explain the classification briefly.

8 Evaluate the mean and variance of the given auto correlation function for a stationary ergodic process with no periodic components. $R_{xx}(\tau) = 25 + \frac{1}{1+6\tau^2}$.

9 Find the PSD of the WSS process X(t) whose auto correlation function of random process is given by $R_{XX}(\tau) = A\ Cos(\omega_0 t)$.

10 Define white noise and colored noise.

PART – B

Answer any four questions. **(4x15 = 60 Marks)**

11 (a) State and prove Total probability and Baye's theorem.
(b) Two boxes are selected randomly. The first box contains 2-white balls and 3-black balls. Second box contains 3-white balls and 4-black balls, then (i) What is the probability of drawing a white ball (ii) If the selected ball is white then what is the probability that it is from first box.

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12 (a) Explain about moments about origin and central moments.
(b) Show that Mean and Variance of Poisson's random variables is same.

13 (a) Consider a random variable X with mean and variances 5 and 2.9 respectively.
Another random variable is given as Y= -8X+10. Find
(i) E[XY] (ii) E[X^2] (iii) E[Y^2] (iv) Var(Y).
(b) Consider two random variables X1 and Y1 related to other random variables X and Y by the coordinate rotation X1=X Cos θ +Y Sin θ and Y1=Y Cos θ –X Sin θ, where θ is the coordinate rotation angle and if X1 and Y1 are independent and uncorrelated Gaussian random variables, then show that $\Theta = \frac{1}{2} Tan^{-1}\left\{\frac{2\rho\ \sigma_X\ \sigma_Y}{\sigma_X^{\ 2} - \sigma_Y^{\ 2}}\right\}$.

14 Consider a stochastic process X(t)=A Cos (ω_1t+ Θ) and Y(t)=B Cos (ω_2t+ Ø), where A,B, ω_1 and ω_2 are constants, Θ and Ø are statistically independent uniformly distributed random variables in the interval [0,2π], then
(i) Show that X(t) and Y(t) are jointly WSS.
(ii) If Θ = Ø, show that X(t) and Y(t) are not jointly WSS unless $\omega_1 = \omega_2$.

15 (a) Explain about band pass process.
(b) Find the Average power Pxx of a random process X(t)= A Cos(ωt+Θ). Where ω, A are real constants and Θ is a Uniform random variable in the interval [0,2π].

16 (a) In a box there are 100 resistors having resistance and tolerance values given by following table. Let a resistor is selected from the box and assume each resistor has same likely chosen and three events are defined as Event A: Draw a 47 ohm resistor, Even B: Draw a 5% tolerance resistor and Event C: Draw a 100 ohm resistor. Then find all joint and conditional probabilities.

Resistance (Ohms)	Tolerance		Total
	5%	10%	
22	10	14	24
47	28	16	44
100	24	8	32
Total	62	38	100

(b) Define Distribution function (CDF) and density function (pdf) of random variable X and Write all properties of CDF and pdf.

17 (a) If the joint density function of two random variables X and Y is $f_{XY}(x,y) = \begin{cases} x+y & 0 \le x \le 1, 0 \le y \le 1 \\ 0 & otherwise \end{cases}$, Calculate the Correlation Co-efficient.
(b) Explain about Strict sense and wide sense stationary processes.

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Code No. 14579/CBCS/BL

FACULTY OF ENGINEERING

B.E. IV - Semester (CBCS) (Mech) (Backlog) Examination, October 2021

Subject: Applied Thermodynamics

Time: 2 Hours **Max. Marks: 70**

(Note: Missing data, if any, may be suitably assumed)

PART – A

Answer any five questions. **(5 x 2 = 10 Marks)**

1 What is after cooling in reciprocating air compressors?
2 What are the advantages of multistage reciprocating air compressors?
3 Sketch and label the parts of a fuel injector.
4 Sketch P-V and T-S diagram of air standard Otto cycle.
5 Define Cetane number rating.
6 Define delay period in diesel engine combustion.
7 Define surface condensers. Give some applications.
8 What are boiler accessories? Give some examples.
9 Define nozzle efficiency.
10 Classify nozzles.

PART – B

Answer any four questions. **(4 x 15 = 60 Marks)**

11 (a) Explain the effect of clearance volume on work input and efficiency of reciprocating air compressor.
(b) A single-stage double-acting compressor has a free air delivery (F.A.D) of 14 m^3/min. measured at 1.013 bar and 15°C. The pressure and temperature in the cylinder during induction are 0.95 bar 32°C. The delivery pressure is 7 bar and index compression and expansion, n=1.3. The clearance volume is 5% of the swept volume. Calculate:
(i) Indicated power required (ii) Volumetric efficiency.

12 (a) Differentiate between 2-stroke and 4-stroke engines.
(b) The output of an I.C engine is measured by a rope brake dynamometer. The diameter of the brake pulley if 750 mm and rope diameter is 50 mm. The dead load on the tight side of the rope is 400 N and the spring balance reading is 50 N. The engine consumes 4.2 kg/h of fuel at rated speed of 1000 r.p.m. The calorific value of fuel is 43,900 kJ/kg. Calculate:
(i) Brake specific fuel consumption, and
(ii) Brake thermal efficiency.

13 (a) Explain the stages of combustion in SI engines.
(b) What are the design considerations for combustion chamber of CI engines?

14 Explain any one type of water tube boiler with the help of a neat sketch. ..2..

15 (a) Derive an expression for mass of steam discharge through nozzle.
(b) Dry saturated steam enters a steam nozzle at a pressure of 15 bar and is discharged at a pressure of 2.0 bar. If the dryness fraction of discharge steam is 0.96, what will be the final velocity of steam? Neglect initial velocity of steam. If 10% of heat drop is lost in friction, find the percentage reduction in the final velocity.

16 (a) Classify boilers.
(b) What are the uses of compressed air?

17 (a) Explain the working of magneto ignition system.
(b) Explain the phenomenon of knocking in CI engine.

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Code No.14582/CBCS/BL

FACULTY OF ENGINEERING

B.E. IV - Semester (CBCS) (Prod) (Backlog) Examination, October 2021

Subject: Applied Thermodynamics & Heat Transfer

Time: 2 Hours **Max. Marks: 70**

(Note: Missing data, if any, may be suitably assumed.)

PART – A

Answer any five questions. **(5 x 2 = 10 Marks)**

1 Explain clearance volume with help of P-V diagram.
2 Define intercooling in multi-stage reciprocating air compressor.
3 Why cooling of an IC Engine is compulsory?
4 Define brake power and frictional power?
5 What do you mean by knocking in I.C engines? Explain briefly.
6 Differentiate between simple and zenith carburetor.
7 Explain the mechanisms of heat conduction in gases, liquids and solids.
8 A perfect absorber of radiant energy is also a perfect emitter? True or false. Why?
9 Explain Kirchhoff's law of radiation.
10 Define effectiveness and NTU of a heat exchanger?

PART – B

Answer any four questions. **(4 x15 = 60 Marks)**

11 Explain with neat sketch the operation of an air compressor. Also draw practical P-V diagram of air compressor.

12 A 4-cylinder petrol engine works on a mean effective pressure of 5 bar and engine speed of 1250 rpm. Find the indicated power developed by the engine if the bore is 100 mm, and stroke 150 mm.

13 a) Explain the working of splash lubrication system with a neat labelled diagram.
b) Briefly explain any one type of fuel injector.

14 Derive the one dimensional steady state heat conduction equation in Cartesian coordinate systems.

15 A double pipe heat exchanger is used to cool the lubricating oil from 92ºC to 42ºC using water available at 10ºC. The mass flow rate of the oil is 0.15 kg/S with specific heat 2.13 KJ/Kg K and that of water is 0.3 Kg/s. Determine the heat transfer area required if U=50W/m2K for (i) Parallel flow arrangement, (ii) Counter flow arrangement.

16 Mention different types of cooling systems typically used for IC engines. Explain any one of them clearly

17 a) Explain the specific fuel consumption, brake power and heat balance sheet in detail.
b) Derive the expression for LMTD in parallel flow heat exchangers

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Code No. 14585/CBCS/BL

FACULTY OF ENGINEERING

B.E. IV - Semester (CBCS) (AE) (Backlog) Examination, October 2021

Subject: Metallurgy and Material Testing

Time: 2 Hours **Max. Marks: 70**

(Note: Missing data, if any, may be suitably assumed)

PART – A

Answer any five questions. **(5 x 2 = 10 Marks)**

1 Define Critical resolved shear stress.
2 Differentiate between ductile and brittle fracture.
3 What is S-N Curve? Explain briefly.
4 Mention the application of diffusion theory in Mechanical Engineering.
5 State and explain Gibbs phase rule.
6 Mention the applications of Grey Cast Iron.
7 Define critical rate of cooling.
8 Differentiate between Austempering and Martempering.
9 Suggest suitable material for gudgeon pin of an I.C. Engine.
10 Distinguish between hardness and hardenability.

PART – B

Answer any four questions. **(4 x 15 = 60 Marks)**

11 (a) Discuss about various crystal imperfections.
(b) Differentiate clearly between edge dislocation and screw dislocation.

12 (a) Discuss the phenomenon of fracture under combined stresses.
(b) Explain the effects of metallurgical variables on fatigue of metals.

13 (a) Sketch and explain the characteristics of Creep curve.
(b) State and explain the Fick's Law of diffusion.

14 (a) Discuss the interpretation of thermal equilibrium diagram of binary alloys.
(b) Explain the Eutectoid and Eutectic reaction.

15 (a) Discuss the construction and interpretation of a TTT Curve.
(b) Explain the process of Annealing with a neat sketch.

16 (a) Discuss the criteria for the selection of material for Connecting rod of an I.C. Engine.
(b) Explain the applications of Composite Materials in Automobile Engineering.

17 Write a short note on following:
(a) Hall-Petch Equation
(b) Flame hardening process.
(c) Liquid Penetrant testing.

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Code No. 14589/CBCS/BL

FACULTY OF ENGINEERING

B.E. (CSE) IV-Semester (CBCS) (Backlog) Examination, October 2021

Subject: OOPS Using Java

Time: 2 hours **Max. Marks: 70**

(Note: Missing data, if any, may be suitably assumed.)

PART – A

Answer any five questions. **(5x2 = 10 Marks)**

1 List the different collection classes and collection interface.
2 Define a two dimensional array of different row sizes.
3 List out the various data types with their ranges.
4 Differentiate Text field and Text Area.
5 Define Serialization.
6 List the character streams.
7 What is the wrapper class?
8 What is a Package?
9 List the byte streams classes.
10 Define string and string buffer.

PART – B

Answer any four questions. **(4x15 = 60 Marks)**

11 Write short notes on the following:
(a) Interface (b) Hash map (c) Package

12 Explain and write a program to demonstrate dynamic method dispatch.

13 Explain about Abstract class with example.

14 What are the different ways of creating thread? Explain any one method with example.

15 Write a program for Mouse Event handling.

16 Write a program to read the strings and sort the list of strings.

17 Explain the use of Comparator with example.

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Code No. 14595/CBCS/BL

FACULTY OF ENGINEERING

B.E. IV - Semester (CBCS) (IT) (Backlog) Examination, October 2021

Subject: OOP Using JAVA

Time: 2 Hours **Max. Marks: 70**

(Note: Missing data, if any, may be suitably assumed)

PART – A

Answer any five questions. **(5x2 = 10 Marks)**

1 Define JDK, JRE and JVM.
2 What is the use of Print Writer Class?
3 Write about serialization.
4 What are the differences between interface and abstract clas?
5 What is “finally” block? When and how it is used?
6 What is event handling? Give different event handling classes.
7 What is the difference between Array List and vector?
8 List most common constructors of File Inputs Stream and File output stream.
9 List the types of Layouts.
10 Define an Applet. Write the structure of simple Apple code.

PART – B

Answer any four questions. **(4x15 = 60 Marks)**

11 (a) Explain in detail the concept of object-oriented programming, with simple examples.
(b) What is encapsulation? Explain with the help of example program.

12 Write a program for serialization concept.

13 (a) Write a program to input three integers through keyboard and print largest among them.
(b) What is the difference between sleep the suspend?

14 Explain the following classes with suitable example.
(i) Buffered Reader (ii) File Input Stream (iii) Print Writer.

15 What is thread synchronization? Write a java program to demonstrate Thread Synchronization.

16 What is the difference between Stream and Byte classes?

17 List three UI components of AWT and their classes and constructor.

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Code No.14047/BL

FACULTY OF ENGINEERING

B.E. 2/4 (CE) II – Semester (Backlog) Examination, October 2021

Subject: Fluid Mechanics-I

Time: 2 Hours **Max. Marks: 75**

(Note: Missing data, if any, may be suitably assumed.)

PART – A

Answer any seven questions. **(7 x 3 = 21 Marks)**

1 Distinguish between uniform flow and steady flow.
2 Prove the relation between surface tension and pressure inside a soap bubble.
3 Define convective and local acceleration.
4 Mention the applications made in Bernoulli's equation.
5 Describe about the basic principle on which Venturimeter works.
6 What do you mean by velocity approach in a notch?
7 Define stagnation point and state its relevance in fluid mechanics.
8 In an air flow in a duct, the ambient temperature is 30ºc and measured stagnation point is 59.7ºc. Find the Mach number of the flow.
9 Show that f = 64/Re, where f is friction factor.
10 The reservoir is connected by two pipes A & B having same length and in series. If the diameter of A is 30% greater than B the ratio of head loss in A to B is_____.

PART – B

Answer any three questions. **(3 x 18 = 54 Marks)**

11 a) Define bulk modulus of elasticity and vapor pressure. Explain the significance of vapor pressure in engineering applications.

b) The velocity potential $\Phi = 5 (x^2 – y^2)$. Calculate the velocity at the point (4,5).

12 a) A 45º reducing bend is connected to a pipeline whose inlet and outlet diameter are 60 cm, 30 cm respectively. The water flow through the pipe is $0.6 m^3/s$, the pressure of water at inlet 90 kN/m^2. Find the total force exerted on bend.

b) Derive Bernoulli's energy equation by integrating Euler's equation of motion in 3-D flow.

13 a) Describe the working principle of bourdon pressure gauge with neat sketches.

b) Through a 15 x 10 cm venture meter oil flows upwards at the rate of 800 lpm. Throat section is 13 cm above inlet. Specific gravity of oil is 0.8. What is the difference in pressure between inlet and throat if Cd is 0.97.

14 Find the Mach number when an aeroplane is flying at 1100 km/hour through still air having a pressure of $7N/cm^2$ and temp -50c. Wind velocity may be taken as zero. Take R = 287.14 J/Kg.K. Calculate the pressure, temperature and density at stagnation point. Take K = 1.4.

15 a) What is Hagen poiseuilles formula? Derive the expression of it?

Contd..2..

b) A pipe line 1500m length and 60 cm diameter is used. To increase discharge, it is proposed to keep another line of same diameter parallel to the first line, in the second half of the length neglecting minor losses and taking f = 0.01 for all pipes, find increase in discharge assuming the head available in the tank is 30m.

16 a) With the aid of neat sketch explain functioning of rotometer
b) Define continuity equation and obtain an expression in three dimensional flow.

17 Write short notes on:

a) Orifice meter
b) Stagnation pressure
c) Reynolds number

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Code No: 14053/BL

FACULTY OF ENGINEERING

BE 2/4 (EEE/Inst.) II- Semester (Backlog) Examination, October 2021

Subject: Electromagnetic Fields

Time: 2 Hours **Max. Marks: 75**

(Note: Missing data, if any, may be suitably assumed)

PART – A

Answers any seven questions. **(7 x 3 = 21 Marks)**

1. Define Electric Flux Density and write the relation with Electric field Intensity
2. Define Gauss Law and write the formula for it
3. Explain magnetic boundary conditions
4. Write the formula for Energy stored in magnetic field & unit of each term
5. Define Magnetic field Intensity
6. What is self and mutual inductance and their unitds?
7. Estimate the distance between the given vectors A (1, 2, 3) and B (2, 1, 2)
8. Derive continuity equation
9. What is skin depth?
10. What are different methods of images

PART- B

Answers any three questions. **(3 x 18 = 54 Marks)**

11. a) Obtain the unit vector in the direction from the origin towards the point p (3, -3, -2)
    b) What are the different coordinate systems used to represent field vectors? Discuss about spherical co-ordinate system in brief

12 a) Derive an expression for force between two current carrying conductors
   b) Find the force on 3nC at (1, 2, 3) m due to a second charge of -0,1 nC at (2,0,5) m in the free space

13 a) Find the potential V on z-axis at distance z from the origin when uniform line charge pL in the form of ring radius a is placed in the z=0 plane.
   b) Find H at the origin due to current element IdL = 3Π (ax+3az) μAm at point p (3,4,5) in free Space.

14 Write Maxwell's equation for time varying fields in point and integral from and Explain.

15 a) An iron ring with a cross sectional area of 3cm square and mean circumference of 15cm is wound with 250turns wire carrying a current of 0.3A. The relative permeability of ring is 1500. Calculate the flux established in the ring.
   b) Derive uniqueness theorem.

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16 Derive EM waves for free space from fundamentals

17. a) A circular disc of radius ‘a’ m charged uniformly with a charge density of $P_s C/m^2$. Find the electric field at a point ‘h’ m from the disc along its axis.
    b) Derive an expression for magnetic field strength H, due to a current carrying conductor of finite length placed along the y-axis, at a point P in x-z plane and r distant from the origin

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Code No: 14061/BL

FACULTY OF ENGINEERING

BE 2/4 (ECE) II- Semester (Backlog) Examination, October 2021

Subject: Networks and Transmission Lines

Time: 2 Hours **Max marks: 75**

(Note: Missing data, if any, may be suitably assumed)

PART – A

Answers any seven questions. **(7 x 3 = 21 Marks)**

1. Draw the T and Pi section networks and write the conversion equations.
2. Define the characteristic impedance of the network.
3. How will you select 'm' in m-derived filters?
4. Define image impedance and iterative impedance.
5. Write about inverse network elements.
6. Mention any two functions of an equalizer.
7. What are the important specifications of telephone cable.
8. What do you understand by loading of a line? What is the purpose of loading?
9. What are the limitations of the single stub matching section?
10. List of applications of smith chart.

PART- B

Answers any three questions. **(3 x 18 = 54 Marks)**

11. (a) Explain about Image impedance and image transfer constant for a two port network. With neat circuit diagrams.
    (b) A symmetrical π - network consists of a series arm of 300 Ω and two shunt arm of 600 Ω each. Determine the characteristic impedance and propagation constant of a network.
12. (a) Design a composite high pass filter with a cut-off frequency of 15 KHz and a Nominal impedance of 600Ω with frequency of infinite attenuation is 14 KHz.
    (b) What is Notch filter? Mention its applications.
13. (a) What are inverse networks? Give examples.
    (b) Find the Second cauer network of the given function $Z(x) = \frac{(s^4 + 6s^3 + 4)}{(s^3 + 2s)}$
14. (a) Define Phase velocity and group velocity and establish relation between them in detail.
    (b) Derive an expression for input impedance of a finite length transmission line.
15. (a) Define reflection coefficient, VSWR. Derive the equation for input impedance of a loss-less transmission line.
    (b) Give design equations and steps for a double stub matching by using smith chart.

..2

16. (a) Explain loading of telephone cables and how is it achieved.
    (b) Show the quarter wave transformer acts as a impedance inverter.

17. Write short notes on

    (a) Campbel's formula

    (b) Distortion in transmission lines

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Code No: 14067/BL

FACULTY OF ENGINEERING

B.E (M/P) 2/4 II – Semester (Backlog) Examination October, 2021

Subject: Basic Electronics

Time: 2 Hours **Max. Marks: 75**

(Note: Missing data, if any, may be suitable assumed)

PART–A

Answer any seven questions. **(7 x 3 = 21 Marks)**

1.What are the applications of diode?

2.What is TUF? What is its Significance?

3.Can two diode connected in back to back work as BJT? Justify your answer.

4.What is Amplification factor of JFET?

5.Define negative feedback?

6. What is Barkhausen Criteria for Sustained Oscillations?

7. Implement AND gate using only NAND gates.

8. Draw the full substractor circuit.

9. What is photo transistor?

10.Mention differences between LED and LCD.

PART–B

Answer any three questions **(3 x 18 = 54 Marks)**

11. a) Compare the Half wave rectifier and Full wave rectifier with respect to all the parameters?
    b) Characteristic of P N junction diode.
12. a) Draw the circuit of a simple CE amplifier and derive the output for it?
    b) Explain the Construction and working of N-channel JFET.
13. a) What are the differences between CE, CB and CC configurations of BJT?
    b) Explain the Construction and working of N-channel JFEF
14. a) Draw the Hartley Oscillator and Derive the Equation for Frequency of oscillations.
    b) Draw the Crystal Oscillator and Write the Equations for Frequency of oscillations.
15. a) What are the Characteristics of Ideal Op-Amp?
    b) Implement Full adder using suitable logic gates.
16. a) Explain the construction working of SCR.
    b) Explain the construction working of UJT.
17. Write short notes on:
    (a) Filters (b) Strain Gauge
    (c) Draw and explain the V- I characteristic of SCR.

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Code No.14071/BL

FACULTY OF ENGINEERING

B.E. 2/4 (AE) II-Semester (Backlog) Examination, October 2021

Subject: Thermal Engineering

Time: 2 hours **Max. Marks: 75**

(Note: Missing data, if any, may be suitably assumed.)

PART – A

Answer any seven questions. **(7 x 3 = 21 Marks)**

1 Explain different types of thermodynamic systems.
2 Mention the applications of SFEE
3 Draw Carnot Cycle on P-V and T-S diagrams.
4 Write Kelvin-Planck statement of Second Law of Thermodynamics.
5 Distinguish between Wet steam, Dry and Saturated steam and superheated steam.
6 What do you mean by Reheating?
7 Define volumetric efficiency of air compressor. State how it varies with Pressure Ratio.
8 What are the desirable properties of an ideal refrigerant?
9 State Newton's Law of Cooling.
10 What is a Black body?

PART – B

Answer any three questions. **(3 x 18 = 54 Marks)**

11 a) State Zeroth law of thermodynamics and explain how it forms the basis for the temperature measurement.

b) A gas undergoes through a thermodynamic cycle consists of three processes beginning at an initial state where P_1=1 bar, V_1=1.5 m^3 and U_1=512 KJ. The three processes are as follows.
(**i**). Process 1-2: compression with PV = C to P_2=2 bar, U_2=690 KJ
(ii). Process 2-3: W_{23} = 0, Q_{23} = -150 KJ and **(iii)**. Process 3-1: W_{31} = 15 KJ
Neglecting KE and PE changes determine the heat interactions Q12 and Q31.

12 a)Explain Heat Engine, Heat Pump and Refrigerator
b)A heat engine receives 1000 kW of heat at constant temperature of 285^0C.The heat is rejected at 5^0C. Specify which of the following heat rejections represent a reversible, irreversible or impossible process:
i) 840 k W ii) 492 k W iii) 300 k W. Comment on the results.

13 0.06 m^3 of air at 5 bar and 200^0C expands isentropically until the pressure becomes 2 bar. It is then heated at constant pressure until the enthalpy increase during this process to 80 kJ. Calculate the work done in each process and the total work done.

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14 a) Explain Rankine cycle with the help of P-V and T-S diagram for vapor cycle.

b) In a Rankine cycle the steam at inlet to turbine is saturated at a pressure of 30 bar and the exhaust pressure is 0.25 bar. Determine

i) Pump work **ii)** Turbine work **iii**) Thermal efficiency

15 A single stage single acting reciprocating air compressor delivers 06 kg/min of air at 6 bar. The temperature and pressure at the suction stroke are 30^0C and 1 bar respectively. The bore and stroke are 100 mm and 150 mm respectively.The clearance volume is 3% of the swept volume and index of compression and expansion is 1.3. Determine **i)** volumetric efficiency of the compressor **ii)** Indicated power **iii)** speed of the compressor

16 a) Explain the working principle of Vapour Absorption Refrigeration System with a neat sketch

b) Explain any three dimensionless numbers used in heat transfer

17 a) What is Overall heat transfer coefficient? Mention its units.

b) Hot oil with a heat capacity of 2500 W/K flows through a double pipe heat exchanger. It enters at 300^0C. Cold fluid enters at 30^0C and leaves at 200^0C. If the overall heat transfer coefficient is 800 W/m^2 K, determine the heat exchanger area required for **i)** parallel flow and **ii)** counter flow.

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Code No: 14074/BL

FACULTY OF ENGINEERING

BE 2/4 (CSE) II- Semester (Backlog) Examination, October 2021

Subject: Microprocessors and Interfacing

Time: 2 Hours **Max marks: 75**

(Note: Missing data, if any, may be suitably assumed)

PART – A

Note: **Answers any seven questions**. **(7 x 3 = 21 Marks)**

1. What are different registers of 8085
2. What are different instruction formats in 8085 explain
3. What is KS 232
4. What are vectored and non vectored interrupts
5. What is synchronous data transmission
6. What is control word register
7. Explain about TMOD and TCON registers of 8051
8. Draw and explain about PSW Register
9. List and explain different arithmetic instruction set in 8086
10. Explain logical and shift instruction sets in 8086

PART- B

Note: **Answers any three questions**. **(3 x 18 = 54 Marks)**

11. Draw and Explain 8085 microprocessor architecture
12. Explain Programmable DMA controller (intel 8257) with Diagram
13. Explain Programmable Communication Interface Intel 8251 with Diagram
14. List and Explain different addressing modes of 8051
15. Explain internal Architecture of 8086 with the help of an diagram
16. Explain in detail
    a) Opcode Fetch machine cycle
    b) Memory Read machine cycle
17. Explain in detail
    a) Register organization of 8086
    b) Memory organization of 8086

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Code No: 14079/BL

FACULTY OF ENGINEERING

BE 2/4 II – Semester (IT) (Backlog) Examination, October 2021

Subject: Computer Organization and Microprocessors

Time: 2 Hours **Max. Marks: 75**

(Note: Missing data, if any, may be suitably assumed)

PART – A

Answers any five questions. **(7 x 3 = 21 Marks)**

1. Define multiprocessor and multicomputer
2. Explain maskable and non-maskable interrupts
3. Write about CISC and RISC
4. What is the function of Bus? Draw the structure of single bus
5. Distinguish between direct addressing mode and indirect addressing mode with example
6. Calculate the average execution time experience with 2 caches (1 primary + 1 secondary) presented in the processor. If M=1m sec, h= 0.7, c1=0.1, c2 = 0.2 (h1 and h2)
7. Write the control word format in the BSR mode
8. Define virtual memory
9. Explain the address capability of 8085 as 64 KB.
10. Explain the function of SP (stack pointer), PC (program counter)

PART- B

Answers any three questions. **(3 x 18 = 54 Marks)**

11. a) Write about DMA controller.
    b) What is Bus Arbitration? And explain its types.

12 a) Discuss briefly the various types of computer.
   b) How the performance of cache can be measured?

13 Write in detail about 8255 in I/O mode.

14 Define Addressing mode. Analyze the various addressing modes of 8085.

15 Explain different data transfer instructions of 8085 with examples.

16 Explain the operation of IEEE 488 (GPIB) in detail.

17 Write in detail about 8279 display controller.

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Code No. 15056/AICTE

FACULTY OF ENGINEERING

B.E. (AICTE)(Civil/EEE/EIE) IV – Semester (Main & Backlog) Examination, October 2021

Subject: Elements of Mechanical Engineering

Time: 2 Hours **Max. Marks: 70**

(Note: Missing data, if any, may be suitably assumed.)

PART – A

Answer any five questions. **(5 x 2 = 10 Marks)**

1. What is the significance of valve timing diagram?
2. Give the applications of gas turbines in various areas of engineering.
3. Define heat transfer. What are the modes of heat transfer?
4. Define LMTD.
5. What is the working principle of pelton wheel?
6. Give difference between reciprocating pump and centrifugal pump.
7. Which gears are used for low speed applications?
8. Define slip and creep in belt drives.
9. What is the purpose of machining processes?
10. Define additive manufacturing.

PART – B

Answer any four questions. **(4 x15 = 60 Marks)**

11. (a) Explain the working of 4 stroke diesel engine with a neat sketch and draw the P-V diagrams for the same.
    (b) With a neat sketch explain the working of brayton cycle in gas turbine.
12. (a) Derive the one dimensional steady state conduction equation heat transfer through plane wall without heat generation.
    (b) Derive the expression of LMTD in parallel flow heat exchangers.
13. With a neat sketch explain the working principle of the following:
    (a) reciprocating pump (b) centrifugal pump
14. (a) Describe the working of a compound gear train with neat sketch and give its applications.
    (b) Derive the expression for the length of open belt drive.
15. (a) Describe the working of ARC welding process of with the help of a neat sketch.
    (b) With the help of neat sketch explain the working mechanism of a milling machine.

16. (a) Explain the different gas flames with a neat sketch.

    (b) Explain the concept of additive manufacturing with example.

17. Write short note on the following:

    (a) IC Engines

    (b) Milling operations

    (c) Belt materials

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Code No: 15276/AICTE

FACULTY OF ENGINEERING

B.E IV – Semester (ECE) (AICTE) (Main) Examination October, 2021

Subject: Signal & Systems

Time: 2 Hours **Max. Marks: 70**

Note: Missing data, if any, may be suitable assumed

PART–A
(Answer any five questions)

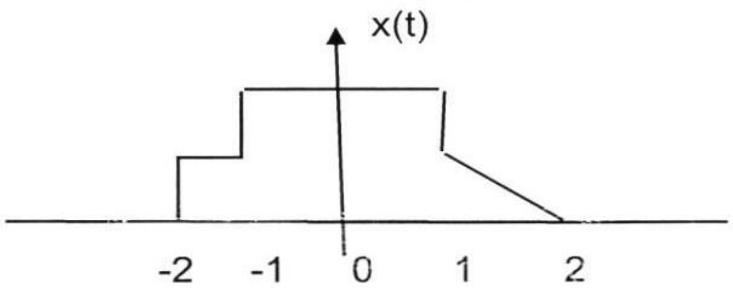
(5x2=10 Marks)

1. Define periodic and aperiodic signals.
2. Determine the power and R.M.S value of the Following Signal.
   (i) 20 cost7t cos15t (ii) 6 cos (40t+π/2).
3. Define Fourier series.
4. What is the relationship between cosine and trigonometric representation?
5. Find the Fourier transform of a signal x(t) = e^{2t} u(t).
6. Define Laplace transform. What is meant by ROC?
7. State Sampling theorem.
8. Find the Fourier transform of the following
   (i) δ(n) (ii) δ(n-k).
9. Define z transform.
10. State time shifting properties of z – transform.

PART–A
(Answer any four questions)

(4x15=60 Marks)

11. (a) For the signal x(t) shown in figure.



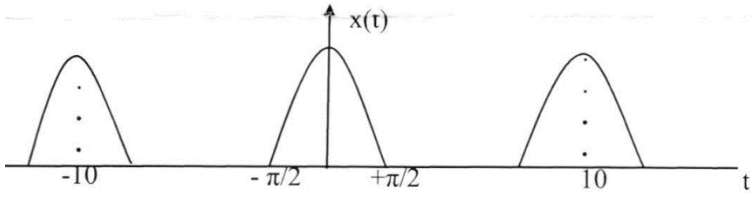
Find the signals (i) x(t-1) (ii) x(3t+4) (iii) x(5/2t) (iv) x(-t+2).

(b) Find even and components of the following signals.

(i) x(t) = (cost + 4sint + 2$\cos^2$t sint) (ii) x(n) = {2,0,-1,4,5}.

..2..

12.(a) For the following signals find the exponential series.



(b) The function f(t) is defined as

F(t) = 1 for $0 \leq t \leq \pi$

= 2 for $0 \leq t \leq 2\pi$.

Show that the above function is orthogonal to signal cost, cost2t, cosnt for all non-zero integral values of n over the integrals 0 to 2π.

13.(a) Find the Fourier transform of (i) sgn(t) (ii) u(t).

(b) Find the Laplace transform of the signal.

$X(t)=e^{-3t}\,u(t)+e^{-2t}\,u(t)$ and find ROC.

14.(a) Find whether the following are periodic or not

(i) $x(n) = e^{j6\pi n}$ (ii) $x(n) = e^{j2\pi/3n} + e^{j3\pi/4n}$.

(b) Find the Fourier transform of $x(n)=\sin(\pi n/2)\,u(n)$.

15.(a) Determine the Z-transform of the following signal $x(n)=1/2(n^2+n)\,(1/3)^{n-1}\,u(n-1)$

(b) Solve the following difference equation for y(n) using Z-transform and the specified initial conditions. $y(n) = 0.5y(n-1)+x(n)$, $n\geq 0$ $x(n) = \cos\pi n/3\,u(n)$ $y(-1)=0$.

16. (a) For a system with transfer function $H(s)=s+5/s^2+5s+6$. Find the zero-state response if the input x(t) is $e^{-3t}\,u(t)$.

(b) State and proof convolution theorem of Z-transform.

17.(a) Explain the condition for sum of two periodic signals to be periodic.

(b) Write short notes on Dirichlet conditions.

(c) Explain in detail about the properties of convolution.

(i) The Distributive property (ii) The Commutative property.

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Code No: 15069/AICTE

FACULTY OF ENGINEERING

B.E IV – Semester (AICTE) (ECE Old) (Backlog) (CSE/IT) (Main & Backlog)
Examination October, 2021
Subject: Signals and Systems

Time: 2 Hours **Max. Marks: 70**
Note: Missing data, if any, may be suitable assumed

PART–A
(Answer any five questions)

(5x2=10 Marks)

1. Sketch the following signal x(t) = u(t) – u(t – 3).
2. Write the properties of Impulse function.
3. Define vector and signal.
4. How do you obtain exponential series coefficient from trigonometric series coefficient?
5. Explain the condition required for Existence of Fourier transform.
6. Find Laplace transform and R.O.C of the signal $x(t)=e^{-at}\,u(t)$.
7. Find the sampling frequency for $x(t) = 2\cos(400\pi t) + 3\sin(200\,\pi t)$.
8. Define aliasing.
9. Find z-transform of the following sequences x(n)={2,3,4,5}.
10. State Time reversal Property of z- transform.

PART–A
(Answer any four questions)

(4x15=60 Marks)

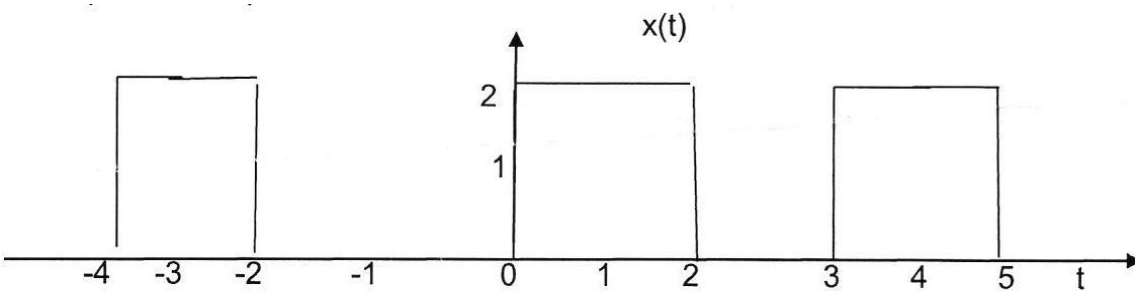
11.(a) Determine the energy and power of the following signals

(i) x(t) = t u(t) (ii) $2e^{j3}\,\pi^{n}$

(b) Sketch the following signals

(i) $x(t)= \pi\ (t-1/3)+\pi(t-2)$ (ii) x(t) = r(t)-3r(t-2)+r(t-4).

12. (a) Compare the exponential series of the following signals.



..2..

(b) A rectangular function is defined as

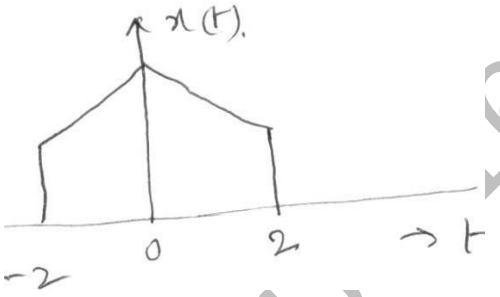
F(t) = 2 for $0 \leq t \leq \pi/2$

= -2 for $\pi/2 \leq t \leq 3\pi/2$

= -2 for $3\pi/2 \leq t \leq 2\pi$.

Approximate the above function by A cost between the intervals $(0,2\pi)$ such that mean square error is minimum.

13. (a) Find the Fourier Transform of the signal shown in following fig.



(b) State and prove Time Differentiation Property of Laplace transform.

14. (a) Find the DTFS representation for $x(n)=4+\sin(n\pi/2) + \cos(n\pi/4)$ and sketch the amplitude and phase spectra.

(b) Explain in detail amplitude scaling and Time scaling of discrete time signals.

15. (a) Determine the Z-transform of the following signal $x(n)=-b^n u(-n-1).u(n)$, find ROC.

(b) Solve the following difference equation for y(n) using Z-transform and the specified initial conditions. .

$y(n) = .01y(n-3)+x(n)$, $n\geq 0$ $x(n) = \cos\pi n/3\ u(n)$ $y(-1)=2$.

16. Using Laplace transform, solve the following differential equation

$d^2y(t)/dt^2 + 4\ dy(t)/dt+3y(t) = dx(t)/dt$ if $y(0^-) = 3$, $d(0^-)/dt = 2$ and $x(t) = e^{-t}\ u(t)$.

(b) Find the z-transform of the following sequences

(i) $x(n) = u(n)-u(n-4)$ (ii) $x(n) = \{-1,-2,-3,1,2,3\}$.

17. (a) Explain about Sinc and Signum function of Continuous time signals.

(b) Explain about Orthogonality in signal space.

(c) Find Fourier Transform of $\sin w_\circ t$.

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Code No. 15081/AICTE

FACULTY OF ENGINEERING

B. E. IV – Semester (AICTE) (A.E.) (Main &BL) Examination, October 2021

Subject: Metallurgy and Material Testing

Time: 2 hours **Max. Marks: 70**

(Note: Missing data, if any, may be suitably assumed.)

PART – A

Answer any five questions. **(5 x 2 = 10 Marks)**

1. Distinguish between edge and screw dislocation.
2. What is Hall-petch Equation?
3. Define Fick's law of diffusion. Explain various factors affecting diffusion.
4. What is low cycle fatigue?
5. How plain carbon steels are classified?
6. What is carburizing?
7. What are usefulness of TTT diagram?
8. What is Induction Hardening?
9. Mention different hardness tests.
10. What is NDT?

PART – B

Answer any four questions. **(4 x 15 = 60 Marks)**

11. (a) Differentiate between ductile and brittle fracture.
    (b) What are line defects? Explain two types of dislocations in detail.
12. (a) Explain creep behavior with the help of a creep curve.
    (b) Explain the fatigue behavior with S-N curve.
13. (a) Classify Plain carbon steels. Explain the effect of carbon on the properties of plain carbon steels.
    (b) Draw iron-iron carbide diagram and label all points, lines and areas.
14. (a) Explain about Case carburizing and Nitriding.
    (b) What is heat treatment cycle? Explain full annealing and process annealing of a steel.
15. (a) Describe the process of tempering and normalizing.
    (b) Draw the cooling curve for pure iron and show the different allotropic form of iron on it.
16. (a) What is surface hardening? Explain in detail various surface hardening methods.
    (b) Write short notes on: (i) Recovery (ii) Recrystallization (iii) Grain Growth.
17. Explain the different non-Destructive Tests.
    (a) Ultrasonic testing.
    (b) Magnetic Particle.
    (c) Liquid penetration testing.

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Code No: 15078/AICTE

FACULTY OF ENGINEERING

B.E. IV-Semester (AICTE) (M/P) (Main& Backlog) Examination, October 2021

Subject: Manufacturing Processes

Time: 2 Hours **Max marks: 70**

(Note: Missing data, if any, may be suitably assumed)

PART – A

Answers any five questions. **(5 x 2 = 10 Marks)**

1. Define pattern? What is the difference between pattern and casting?
2. Write the functions of gating and riser
3. State the pressurized and non-pressurised gating ratio.
4. Define are hot tears? How to avoid hot tears in castings
5. Explain casting yield? Why casting yield is 100% in centrifugal castings
6. Define Weldability? What factors influence weldability?
7. Define flux? Why is it essential to use in welding?
8. State the difference between forward and backward extrusion process
9. Differentiate between blanking and piercing.
10. Describe high energy rate forming?

PART - B

Answers any four questions. **(4 x 15 = 60 Marks)**

11. a) Discuss various materials used for pattern making? Compare its merits, demerits and applications.
    b) Describe directional solidification? How chills are used in promoting directional solidification.

12.a) Explain the principle, advantages and applications of centrifugal casting process.
    b) Explain the process of making components by blow moulding process.

13.a) Explain GMAW with neat sketch and state its advantages, limitations and applications.
    b) Explain Friction welding process with neat sketch and state its advantages and limitations.

14. a) Explain about atomic hydrogen welding process with neat sketch
    b) Describe the types of flames obtained in gas welding process.

..2

15. a) Distinguish between hot working and cold working process.
    b) Explain with sketches of impact extrusion and hydrostatic extrusion.

16. a) Explain the powder metallurgy process with a block diagram
    b) Describe the thermoforming process with its applications

17. a) Explain explosive forming process.
    b) Explain the following terms.
    i. Directional solidification ii. Chills and chaplets iii. Yield criteria

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