AR20

CODE: 20CET204   SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Regular Examinations, March-2022
Engineering Geology
(CIVIL ENGINEERING)

Time: 3 Hours   Max Marks: 60

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

		UNIT-I	Marks	CO	Blooms Level
1.	a)	Define Engineering Geology. Describe about branches of geology and its importance in Civil Engineering works.	5M	01	2
	b)	What is the importance of engineering geology related to civil engineers in working site?	5M	01	2
		(OR)			
2.	a)	Write the physical properties of QUARTZ group of minerals.	5M	01	2
	b)	Differentiate the physical properties of Muscovite and biotite mica.	5M	01	2
		UNIT-II	Marks	CO	Blooms Level
3.	a)	What is the igneous rock? Give their characteristics.	5M	02	2
	b)	Explain the textures of igneous rocks with sketches.	5M	02	2
		(OR)			
4.	a)	What is texture of a rock? Discuss the various types of textures in sedimentary rocks.	5M	02	2
	b)	Explain the peterographic characteristics of lime stone and marble with their civil engineering importance?	5M	02	2
		UNIT-III	Marks	CO	Blooms Level
5.	a)	Explain the process of weathering.	5M	03	2
	b)	Define the term strike, dip and outcrop	5M	03	2
		(OR)			
6.	a)	What are the parts of faults? Give their types of faults with sketches.	5M	03	2
	b)	Classify and describe different types of joints in rock with neat sketches.	5M	03	2
		UNIT-IV	Marks	CO	Blooms Level
7.	a)	Write short note on i) cone of depression ii) geological controls of ground water movement.	5M	04	2
	b)	Explain the classification of Landslides.	5M	04	2
		(OR)			
8.	a)	Explain about Aquifers, Aquifuge and Aquiclude.	5M	04	2
	b)	Explain about geological controls of ground water movement.	5M	04	2
		UNIT-V	Marks	CO	Blooms Level
9.	a)	Explain the influence of geological structures for Tunneling.	5M	05	2
	b)	Explain the effects and Over break of Tunnels.	5M	05	2
		(OR)			
10.	a)	What are the geological conditions necessary for the stability of a dam and life of a reservoir?	5M	05	2
	b)	Explain with neat sketches about Arch & Buttress Dams	5M	05	2
		UNIT-VI	Marks	CO	Blooms Level
11.	a)	Discuss the following terms with a neat sketches Focus ii) Epicenter iii) Fault Plane iv) Fault Scarp	5M	06	2
	b)	Explain briefly the seismic zones of India	5M	06	2
		(OR)			
12.	a)	Explain the causes and effects of earthquakes.	5M	06	2
	b)	What are the precautions while constructing engineering structures?	5M	06	2

AR20

Time: 3 Hours   Max Marks: 60

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.		Derive the necessary torque equation of PMMC instruments and explain in brief the effect of temperature changes in Ammeters.	(10M)	CO1	Understand
		(OR)			
2.	a)	Derive the expression for torque equation of a moving iron instrument and comment up on the nature of the scale.	(5M)	CO1	Understand
	b)	An absolute electrometer uses a movable circular plate 70 mm in diameter. During a voltage measurement, the distance between the plates is 3.2 mm and the force of attraction is 0.003N. The medium is air. $\varepsilon_0 = 8.854 \times 10^{-12}$ F/m. Find the Voltage.	(5M)	CO1	Understand
		UNIT-II	Marks	CO	Blooms Level
3.	a)	Explain the principle of operation of the Double dynamo meter wattmeter with a neat connection diagram.	(5M)	CO2	Understand
	b)	Explain the meaning of the term ration error of the instrument transformer.	(5M)	CO2	Understand
		(OR)			
4.	a)	Describe the feature incorporated in an electro dynamometer wattmeter to make it a low power factor type of wattmeter.	(5M)	CO2	Understand
	b)	Illustrate the Measurement of active and reactive powers in balanced and unbalanced systems.	(5M)	CO2	Apply
		UNIT-III	Marks	CO	Blooms Level
5.	a)	Explain the principle of operation of energy meter with a neat connection diagram.	(5M)	CO3	Understand
	b)	A 50 A, 230 V meter on full load test makes 61 revolutions in 37 seconds. If the normal disc speed is 520 revolutions per KWh, find the percentage error.	(5M)	CO3	Understand
		(OR)			
6.	a)	What is phantom loading? Explain with an example how it is more advantageous than testing with direct loading	(5M)	CO3	Understand
	b)	A meter, whose constant is 600 revolutions per KWh, makes 5 revolutions in 20 seconds. Calculate the load in KW.	(5M)	CO3	Understand

			Marks	CO	Blooms Level

7.	a)	Explain Wien's bridge for measurement of frequency and derive the necessary relation.	(5M)	CO4	Understand
	b)	The four arms of a Hay's bridge are arranged as follows: AB is a coil of unknown impedance; BC is a non-reactive resistor of 100Ω ; CD is a non- reactive resistor of 833Ω in series with a standard capacitor of 0.38µF; DA is non-reactive resistor of 16800Ω. If the supply frequency is 50 Hz, determine the inductance and the resistance at the balanced conditions.	(5M)	CO4	Understand

(OR)

8.	a)	Describe the working of hay's bridge for measurement of inductance. Derive the equations for balance condition	(5M)	CO4	Understand
	b)	Calculate the insulation resistance of a length of cable in which voltage falls from 120 to 80 Volts in 20 seconds, the capacity being 0.0004 µF.	(5M)	CO4	Understand

UNIT-V

			Marks	CO	Blooms Level
9.	a)	Explain the construction and working of flux meter.	(5M)	CO5	Understand
	b)	Explain the working of Drysdale Polar Potentiometer with a neat circuit diagram	(5M)	CO5	Understand

(OR)

10.	a)	Explain the term standardization and describe the procedure of standardization for a DC potentiometer.	(5M)	CO5	Understand
	b)	Explain about the Gall-Tinsely potentiometer.	(5M)	CO5	Understand

UNIT-VI

			Marks	CO	Blooms Level
11.	a)	Describe the sweep generator from an analog system?	(5M)	CO6	Understand
	b)	Explain the working of Successive - approximation type Digital energy meter with a neat block diagram	(5M)	CO6	Understand

(OR)

12.	a)	Discuss in detail about the block diagram and working of a digital multimeter.	(5M)	CO6	Understand
	b)	Describe the working of LVDT.	(5M)	CO6	Understand

CODE: 20MET203   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Regular Examinations, March-2022
FLUID MECHANICS
(Mechanical Engineering)

Time: 3 Hours   **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

		UNIT-I	Marks	CO	Blooms Level
1		Prove the statement of Pascal law by using wedge shaped element.	10 M	1	Evaluating
		(OR)			
2.	a)	Distinguish between pressure gauges and manometers	5M	1	Analyzing
	b)	A manometer is fitted as shown in the figure below. Determine the pressure at point A.	5M	1	Evaluating
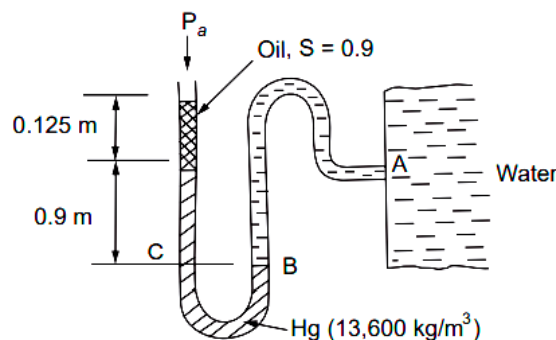
		UNIT-II	Marks	CO	Blooms Level
3.	a)	Prove that the total pressure exerted by a static liquid on an inclined plane submerged surface is same as the force exerted on a vertical plane surface as long as the depth of the centre of gravity of the surface is unaltered.	10	2	Evaluating
		(OR)			
4.	a)	A body of dimensions 2m × 3 m× 4m, weighs 2000 N in water. Find its weight in air and specific gravity.	5M	2	Understanding
	b)	A solid cylinder of 6 m in diameter has a height of 4 meters. Find the metacentric height of the cylinder when it is floating in water with its axis vertical. Take specific gravity of cylinder as 0.7	5M	2	Understanding

		UNIT-III	Marks	CO	Blooms Level
5.	a)	Derive three dimensional continuity equation.	10	3	Applying
		(OR)			
6.	a)	Establish forces from Momentum equations and state its applications.	5	3	Understanding
	b)	A horizontal water pipe of diameter 15 cm converges to 7.5 cm diameter. If the pressure at the two sections is 400 kPa, and 150 kPa respectively, calculate the flow rate of water.	5	3	Evaluating

				Marks	CO	Blooms Level

UNIT-IV

7.	a)	Derive discharge through venturimeter using..	10	4	Understanding

(OR)

8.	a)	Derive a relation for finding loss due to sudden expansion in a pipe flow	5	4	Understanding
	b)	A horizontal pipe, 10 cm in diameter, is joined by sudden enlargement to a 15 cm diameter pipe. Water is flowing through it at the rate of 2 m^3/min. Find the loss of head due to abrupt expansion and the pressure difference in the two pipes.	5	4	Evaluaate

			Marks	CO	Blooms Level

UNIT-V

9.	a)	Explain the significance of dimensional analysis applied to fluid flow problem.	5	5	Understanding
	b)	What are the various methods of dimensional analysis to obtain a functional relationship between various parameters affecting physical phenomenon. Describe with an illustration	5	5	Analyzing

(OR)

10.	The resisting force **R** of a supersonic plane during flight can be considered as dependent upon length of the aircraft **L**, velocity $\boldsymbol{V}$, air viscosity **μ**, air density **ρ**, and bulk modulus of air **K**. Using Buckingham's π-theorem, express the functional relationship between these variables and the resisting force	10	5	Understanding

			Marks	CO	Blooms Level

UNIT-VI

11.	Derive the equation for finding displacement thickness for the flow over a flat plate.	10	6	Understanding

(OR)

12.	Find the displacement thickness, the momentum thickness and energy thickness for the velocity distribution in the boundary layer given by $\frac{u}{U} = \left(\frac{y}{\delta}\right)$, Also find the value of $\frac{\delta^*}{\theta}$	10	6	Evaluating

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Regular Examinations, March-2022
SIGNALS & SYSTEMS
(Electronics and Communication Engineering)

Time: 3 Hours   Max Marks: 60

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	Determine whether the following signal is periodic signal or aperiodic signal. In the case of periodic signal, determine the fundamental period. $$x(t) = 5\cos(4\pi t) + 3\sin(8\pi t)$$	4	1	Apply
	b)	Derive condition for orthogonality of two signals	6	1	Understand
		(OR)			
2.	a)	A discrete-time sequence $x[n]$ is defined as $x[n] = \{-2\ \ 1\ \ 3\ \ \underset{\uparrow}{-1}\ \ 0\ \ 3\ \ 4\ \ 5\ \ 2\ \ 1\}$. Sketch and label the following sequences. (a) $x[n]\delta[n]$ (b) $x[n]\delta[n-3]$ (c) $x[n]u[n]$ (d) $x[n]u[n+2]$.	5	1	Apply
	b)	Define a complete set and hence show that the error can be minimized when the function f(t) is approximated using n set of orthogonal functions	5	1	Understand

			Marks	CO	Blooms Level
		UNIT-II			
3.	a)	Find the Fourier series expansion for the waveform shown in figure.	6	2	Apply

The waveform is $x(t) = \begin{cases} -\dfrac{At}{\pi} & for\quad -\pi \le t \le 0 \\ \dfrac{At}{\pi} & for\quad 0 \le t \le \pi \end{cases}$

			Marks	CO	Blooms Level
	b)	Determine the Fourier transform of the signal $x(t) = e^{-a|t|}, a > 0$	4	2	Apply
		(OR)			
4.	a)	Explain Trigonometric Fourier series and Exponential Fourier series	4	2	Understand
	b)	Determine the Fourier Transform of (i) Signum function (ii) Impulse function	6	2	Apply

			Marks	CO	Blooms Level

UNIT-III

			Marks	CO	Blooms Level
5.	a)	For the following system, determine whether the system is stable, causal, linear and time-invariant . y(n)=nx(n)	6	3	Apply
	b)	Explain Causality and poly weinercriterian.	4	3	Understand

(OR)

			Marks	CO	Blooms Level
6.	a)	Validate that the system with excitation $x(t)$ and response $y(t)$ described by the following equation are linear, time variant, static, and causal. $y(t)=x(t-5)-x(3-t)$.	6	3	Apply
	b)	Discuss the conditions for distortionless transmission.	4	3	Understand

UNIT-IV

			Marks	CO	Blooms Level
7.	a)	Derive the relationship between autocorrelation and power spectral density of a power signal	5	4	Understand
	b)	The output y(t) of a continuous-time LTI system is found to be $2e^{-3t}u(t)$ when the input x(t) is u(t). Find the impulse response h(t) of the system	5	4	Apply

(OR)

			Marks	CO	Blooms Level
8.	a)	Determine the cross correlation between x(n)={1,3,2,3} and h(n)={2,4,2,1}	5	4	Apply
	b)	Define convolution State all properties of convolution	5	4	Understand

UNIT-V

			Marks	CO	Blooms Level
9.	a)	Find the Laplace transform and ROC of the signal $x(t)=e^{-3t}u(t)+e^{-2t}u(t)$	5	5	Apply
	b)	Find the inverse Laplace transform of $X(s)=\dfrac{1}{(s+4)(s-2)}$ if the ROC is $-4<\mathrm{Re}(s)<2$	5	5	Apply

(OR)

			Marks	CO	Blooms Level
10.	a)	Use the convolution theorem of Laplace transform to find $y(t)=x_1(t)*x_2(t)$ where $x_1(t)=e^{-3t}u(t)$ and $x_2(t)=u(t-2)$	6	5	Apply
	b)	Let X(s)=L{X(t)}.Determine the initial value, X(0) and the final value, X(∞), for the following signal using initial value and final value theorems. $X(s)=\dfrac{5s+50}{s(s+5)}$	4	5	Apply

UNIT-VI

			Marks	CO	Blooms Level
11.	a)	State and prove sampling theorem.	6	6	Understand
	b)	Discuss the types of Sampling with neat sketches	4	6	Apply

(OR)

			Marks	CO	Blooms Level
12.	a)	Apply the sampling theorem to find the Nyquist rate and sampling interval corresponding to each of the following analog signals: (i) $x(t)=1+\cos 2000\pi t \sin 4000\pi t$ (ii) $x(t)=\left[\dfrac{\sin 4000\pi t}{\pi t}\right]^2$	4	6	Apply
	b)	Determine the inverse ZT of the sequence $X[z]=\dfrac{1+2z^{-1}}{1-2z^{-1}+z^{-2}}$ if x(n) is causal	6	6	Apply

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Time: 3 Hours   Max Marks: 60

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

		UNIT-I	Marks	CO	Blooms Level
1.	a)	With neat diagram explain basic functional units of a computer.	5	1	1
	b)	Define ISA, What is the role of ISA in organization.	5	1	1
		(OR)			
2		List and explain about addressing modes with example.	10	1	2
		UNIT-II	Marks	CO	Blooms Level
3.	a)	Write Booth algorithm for multiplication of signed 2's complement numbers.	5	2	3
	b)	Illustrate a 4-bit adder/subtractor which performs addition if M=0 and subtraction if M=1. Assume A=1010, B=1011 and the initial carry Cin=1.	5	2	4
		(OR)			
4.	a)	Explain the H/W implementation of adder /subtractor for fixed point Number with neat sketch and flowchart.	5	2	2
	b)	Construct the flowchart for division operation for signed magnitude data.	5	2	2
		UNIT-III	Marks	CO	Blooms Level
5.	a)	Compare and contrast direct and associative mapping techniques.	5	3	2
	b)	One program contains 100 instructions and 76% instructions are available in cache memory and it takes 60ns for accessing cache memory, remaining instructions are available in main memory with accessing time of 86ns, calculate cache performance & calculate average memory accessing time.	5	3	4
		(OR)			
6.	a)	Discuss the efficiency of hierarchical organization of memory in terms of speed, size and Cost.	5	3	2
	b)	Briefly discuss the single level cache memory organization.	5	3	2
		UNIT-IV	Marks	CO	Blooms Level
7.		Draw the block diagram of DMA controller & Explain the three possible configuration of DMA transfer	10	4	2
		(OR)			
8.	a)	Interpret the operation of isolated I/O device with neat sketch.	5	4	2
	b)	What is priority interrupt? Explain the Daisy Chaining Priority arrangement?	5	4	2
		UNIT-V	Marks	CO	Blooms Level
9.		What are the different ways for achieving parallel processing? Explain them.	10	5	2
		(OR)			
10.	a)	What is pipelining? Illustrate four segment Instruction Pipeline?	5	5	2
	b)	Illustrate the concept of structural hazards in a pipelined system.	5	5	2
		UNIT-VI	Marks	CO	Blooms Level
11.		Differentiate between time-shared versus multiport common bus multiprocessor systems.	10	6	2
		(OR)			
12.		Explain about serial arbitration procedure and parallel arbitration logic with neat sketch	10	6	2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, November, 2019
ELECTRONIC DEVICES AND CIRCUITS
(Electrical and Electronics Engineering)

Time: 3 Hours   **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Explain the working principle and operation of LED	6M
	b)	Forward bias characteristics of PN diode with forward bias and reverse bias	6M

(OR)

2.	a)	Explain the forward bias and reverse bias characteristics of Zener diode	6M
	b)	Describe the operation of Zener diode as a voltage Regulator	6M

UNIT-II

3.	a)	Derive the expression for ripple factor and efficiency of a Full Wave Rectifier	6M
	b)	Determine (i) Im, Idc, Irms (ii) a.c. power input and d.c. power output (iii) d.c. output voltage of a crystal diode having internal resistance rf = 20Ω is used for half-wave rectification. The applied voltage v = 50 sin ω t and load resistance RL= 800 Ω	6M

(OR)

|			
4.	a)	Explain operation of half wave rectifier with LC filter	6M
	b)	Compare HWR with FWR based on the following: PIV, ripple factor, efficiency, TUF and components used	6M

UNIT-III

5.	a)	Derive the relationship between α,β,γ	6M
	b)	Illustrate the input and output characteristics of CE configuration	6M

(OR)

6.	a)	Explain the early effect in CB configuration	6M
	b)	Explain the operation of MOSFET in Enhancement mode	6M

UNIT-IV

7.	a)	Explain the criteria for fixing the operating point of Transistor amplifier.	6M
	b)	Define Thermal Runaway and derive the condition to avoid thermal runaway	6M

(OR)

8. a)   For the circuit shown in fig. draw the DC load line.   6M
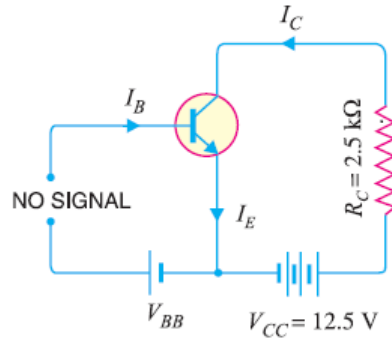
     b)   Derive the expression for stability factor of a CE fixed bias circuit   6M
                                    UNIT-V

9.   a)   Explain the operation of transistor as an amplifier.   6M
     b)   Compare the CE, CB and CC amplifiers based on the following: Input   6M
          resistance, output resistance, Voltage gain, Current gain. Applications,
                                      (OR)
10. a)   Explain the operation of Wien bridge oscillator and reproduce the expression for   6M
          frequency of oscillations.
     b)   Describe the working principle of any one LC oscillator and reproduce the   6M
          expression for frequency of oscillations.

AR18

UNIT-I

1. a) Explain the following: (i) Specific gravity (ii) Compressibility (iii) Pascal's law. — 6M
   b) A 400 mm diameter shaft is rotating at 200 rpm in a bearing of length 120 mm. If the Thickness of oil film is 1.5 mm and the dynamic viscosity of the oil is 0.7 Ns/m^2. Determine: (i) Torque required overcoming friction in bearing. (ii) Power utilization in overcoming viscous resistance. — 6M

(OR)

2. a) Derive the expressions for excess pressure in a (i) spherical liquid droplet and (ii) an air bubble. — 6M
   b) The right limb of a simple U-tube manometer containing mercury is open to the atmosphere while the left limb is connected to a pipe in which a fluid of specific gravity 0.9 is flowing. The centre of the pipe is 12 cm below the level of mercury in the right limb. Find the pressure of the fluid in the pipe, if the difference of mercury level in the two limbs is 20 cm. — 6M

UNIT-II

3. a) The velocity vector in a fluid flow is given $V=4x^3i-10x^2yj+2tk$. Find the velocity and acceleration of a fluid particle at (2,1,3) at time t=2 units. — 8M
   b) Compare the following: (i) uniform flow vs non-uniform flow (ii) steady vs unsteady flow. — 4M

(OR)

4. a) Derive the Bernoulli's equation along a stream line in 3-D flow. Also state its assumptions. — 8M
   b) A pipe through which water is flowing have diameters 40 cm and 20 cm at cross-sections 1 and 2 respectively. The velocity of water at section-1 is 4 m/s. Determine the rate of discharge and velocity head at sections-1 and 2. — 4M

5. a) Explain the following: (i) coefficient of discharge (ii) major loss (iii) impulse momentum principle.   6M

    b) A compound piping system consists of 1800 m of 0.50m ,1200 m of 0.40 m and 600 m of 0.30 m new cast iron pipes in series. Connect the system to (a) an equivalent length of 0.40 m diameter pipe, and (b) equivalent pipe size of 3600m long.   6M

(OR)

6. a) A pipe carrying oil of specific gravity 0.87, changes in diameter from 200mm diameter at a position A to 500mm diameter at a position B which is 4m at a height level. If the pressure at A and B are $9.81 N/cm^2$ and $5.886\ N/cm^2$ respectively and the discharge is 200liters/s. Determine the loss of head and direction of flow.   8M

    b) A jet of water of diameter 100mm moving with a velocity of 30 m/s strikes a curved fixed symmetrical plate at the centre. Find the force exerted by the jet of water in the direction of jet, if the jet is deflected through an angle of 120^0 at the outlet of the curved plate.   4M

UNIT-IV

7. a) Compare impulse and reaction turbines.   4M

    b) A Pelton wheel is having a mean bucket diameter of 1 m and is running at 1000 r.p.m. The net head on the Pelton wheel is 700 m. If the side clearance angle is 15^0 and discharge through nozzle is 0.1 m^3/s, neglecting frictional effects find :   8M
        i. Power available at the nozzle
        ii. Hydraulic efficiency of the turbine

(OR)

8. a) Explain the functions of a draft tube. Classify draft tubes with simple sketches.   6M

    b) A Kaplan turbine develops 24647.6 KW power at an average head of 39 m. Assuming a speed ratio of 2, flow ratio of 0.6, diameter of the boss equal to 0.35 times the diameter of the runner an overall efficiency of 90%, calculate the diameter, speed and specific speed of the turbine.   6M

UNIT-V

9. a) A centrifugal pump having outer diameter equal to two times the inner diameter and running at 1000r.p.m. works against a total head of 40m. The velocity of flow through the impeller is constant and equal to 2.5m/s. the vanes are set back at an angle of 40^0 at outlet. If the outer diameter of the impeller is 500mm and width at outlet is 50mm. determine: (i) Vane angle at inlet (ii) Work done by the impeller on water per second (iii) Manometric efficiency.   8M

    b) Explain the working of a reciprocating pump with a neat sketch.   4M

(OR)

10.   Explain the following phenomenon: (i) priming (ii) cavitation and its effects (iii) slip in hydraulic pumps.   12M

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, February,2022
SIGNALS & SYSTEMS
(Electronics and Communication Engineering)

Time: 3 Hours   Max Marks: 60

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Show that the following signal orthogonal over an interval [0,1]   6M
        $x_1(t) = 2$
        $x2(t) = \sqrt{3}\ (1-2t)$

    b) Discuss the analogy between signals and vectors   6M
                                    (OR)
2. a) Show that if $\omega_1 = \omega_2$, the power of $x(t) = C_1 \cos(\omega_1 t + \theta_1) + C_2 \cos(\omega_2 t + \theta_2)$ is   6M
        $[C_1^2 + C_2^2 + 2C_1 C_2 \cos(\theta_1 - \theta_2)]/2$,

    b)   6M
        Show that the complex exponential signal $x(t) = e^{j\omega_0 t}$ is periodic and that its
        fundamental period is $2\pi/\omega_0$

UNIT-II

3. a) Discuss about Dirichled conditions for Fourier series representation   6M
    b) Illustrate any four properties of Fourier transform.   6M
                                    (OR)
4. a) Find the Trigonometric Fourier series of $x(t)$ 6M
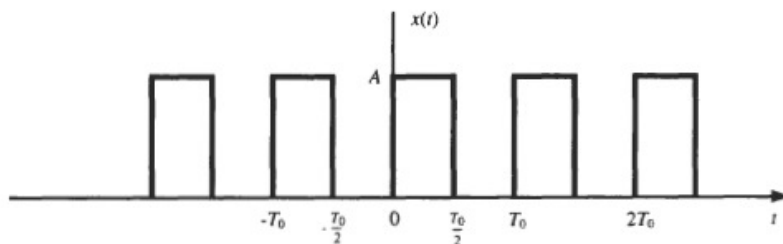
    b) Find the Fourier transform of the continuous-time signal   6M
        i) $x(t) = \exp(-at)\ u(t),\quad a>0$
        ii) $X(t) = \begin{cases} A, & |t| < T_0 \\ 0, & |t| > T_0 \end{cases}$

UNIT-III

5. a) What is Poly-Wiener criterion? What is its significance?   6M
    b) Explain about the different ideal filter characteristics   6M
                                    (OR)
6. a) Discuss about the distortion less transmission through an LTI system.   6M
    b) Explain the properties of continuous time LTI system.   6M

UNIT-IV

7. a) Prove that the correlation and convolution functions are identical for even signals.   6M

    b) Explain the signal recovery from its sampled signal.   6M

(OR)

8. a) State and prove any four properties of Autocorrelation function.   6M

    b) The autocorrelation function of an aperiodic signal is given as   6M

$$R(\tau) = e^{\left(-\tau^2 / \sigma^2 \right)}$$

UNIT-V

9. Find the Z transform and the associate ROC of the following Signals   12M

    i. $-u[-n-1]$

    ii. $n\,a^n\,u[n]$

    iii. $\cos(\omega_0 n)\,u[n]$

(OR)

10. Find the Laplace transform and the associated ROC for following signals   12M

    i. $e^{-2t}[u(t) - u(t-5)]$

    ii. $t\,e^{-at}\,u(t)$

    iii. $\cos \omega_0 t$

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AR18

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, March-2022
FREE OPEN SOURCE SOFTWARE
(Common to CSE & IT)

Time: 3 Hours   Max Marks: 60

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Describe the need of FOSS	6
	b)	List some Free & open source soft wares with their features	6

(OR)

2.	a)	Explain Python Installation steps	5
	b)	How do you run a python code in python environment? Explain with an example.	7

UNIT-II

3.	a)	Explain the conditional statements supported by Python with examples	7
	b)	Explain the while- else with an example	5

(OR)

4.	a)	Is string mutable? Justify your answer with suitable examples	6
	b)	i) Write a python code snippet to print the reverse of a string	3
		ii) Write a python code snippet to search 'A' in "AITAM " string and print the count	3

UNIT-III

5.	a)	Differentiate Lists and tuples	6
	b)	Explain nested dictionaries with an example	6

(OR)

6.	a)	Write a python code snippet to create a file and write the content into the file as " WELCOME AITAM"	7
	b)	Explain different file modes and their significance	5

UNIT-IV

7.	a)	Explain the features of Perl	6
	b)	Write about Arrays in Perl with examples	6

(OR)

8.	a)	Describe the differences between "for" and " foreach" of Perl scripting with suitable examples	6
	b)	Explain the "redo", "goto" statements of perl scripting with examples	6

UNIT-V

9.	a)	Describe how to define a sub routine and calling a routine with an example	6
	b)	Explain the various operators available in Perl scripting.	6

(OR)

10.	a)	Write a Perl script to open a file with read mode and read all lines from the file	6
	b)	Explain getc, read and print functions of Perl scripting	6

AR16

CODE: 16CE2006   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, March-2022
ENGINEERING GEOLOGY
(Civil Engineering)

Time: 3 Hours   **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Give a brief account of the importance of geology in civil engineering. Explain your answer by giving suitable example.	7M
	b)	Discuss how geological studies can be utilized in civil engineering projects.	7M

(OR)

2.	a)	Explain the geological action of streams. Discuss the formation of ox-bow lake.	7M
	b)	Define rock weathering. Explain geological work of mechanical weathering.	7M

UNIT-II

3.	a)	Write megascopic study of following rocks: i) Sandstone ii) Pegmatite iii) Gneiss	7M
	b)	What is meant by rock cycle? Discuss the different types of texture of igneous rocks.	7M

(OR)

4.	a)	Describe in detail, the process of weathering of rocks. Add a note on the effect of weathering on the strength of rocks.	7M
	b)	What is the difference between a batholiths and a stock? Explain with neat diagrams	7M

UNIT-III

5.	a)	Classify the various types of faults and explain it diagrammatically.	7M
	b)	What are unconformities? How are these recognized?	7M

(OR)

6.	a)	Explain the following with neat sketches: (i) Dip and strike (ii) Parts of fold (iii) Mural Joints. (iv) Dome and Basin.	7M
	b)	Write short notes on the following with neat sketches: (i) Fan fold (ii) Columnar joints (iii) Angular unconformities and (iv) Radial faults.	7M

UNIT-IV

7.	a)	Describe the geological considerations relating to the construction of gravity and arch type of concrete dam.	7M
	b)	Write about factors affecting the water-tightness of a dam reservoir.	7M

(OR)

8.	a)	Explain with neat diagram favorable and unfavorable dips at a Tunnel site.	7M
	b)	What is a dam? With what purposes it will be constructed? Explain in detail the geological investigations of a good dam site.	7M

UNIT-V

9.	a)	State the principle of seismic method and explain it related to civil engineering.	7M
	b)	What is the importance of geophysical methods, classify and explain their applications.	7M

(OR)

10.	a)	Give a detailed account of seismic surveys and interpretation of seismic data for subsurface investigation.	7M
	b)	Elaborate on the electrical methods used for sub-surface investigations.	7M

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AR16

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, March-2022
ELECTRONIC DEVICES AND CIRCUITS
(Electrical and Electronics Engineering)

Time: 3 Hours   **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Discuss Zener breakdown mechanism and also how it acts as a voltage regulator   7M

   b) Explain the concept of electrons and holes in intrinsic semiconductors, extrinsic semiconductors along with examples   7M

(OR)

2. a) Draw the circuit diagram of a Full-wave rectifier and derive expressions for Idc, Irms, Pac, η. Sketch the relevant input and output wave forms.   10M

   b) Give the advantages and disadvantages of HWR and FWR.   4M

UNIT-II

3. a) Explain MOSFET in enhancement and depletion mode with the required figures.   10 M

   b) Differentiate between BJT and JFET   4 M

(OR)

4. a) Draw the circuit diagram of a self-bias and derive the expression for stability factor.   7M

   b) For a certain BJT I_{CBO} = 0.1μa, I_{CEO} = 16μA Calculate μ and β   7M
   For a given BJT β = 100, I_{CBO} = 0.1μA, I_B = 80μA Determine I_E.

UNIT-III

5. a) i) Explain the importance of biasing ii) Write a brief note on Stability factors.   7M

   b) Briefly explain about stabilization against variations in V_{BE} and β for the selfbias circuit   7M

(OR)

6. a) Explain the operation of collector to base bias   7 M

   b) Derive an expression for the condition to avoid thermal runaway   7M

UNIT-IV

7. a) Draw the h-parameter equivalent circuit for a typical common base amplifier and derive expressions for Ai and Av.   7M

   b) Draw the small signal model of JFET amplifiers   7M

(OR)

8. a) A CE amplifier is drawn by a voltage source of internal resistance r_s = 800 Ω, and the load impedance is a resistance R_L = 1000Ω. The h-parameters are h_{ie}=1KΩ, h_{re}=2x10^{-4}, h_{fe}=50 and h_{oe}=25μA/V. Compute the current gain, input resistance, voltage gain and output resistance.   10M

   b) Define the various h-parameters and give their units   4M

UNIT-V

9. a) Write short notes on crystal oscillator   4M

   b) Draw the circuit of a RC phase shift oscillator and derive the condition for the frequency of oscillation   10M

(OR)

10. a) Explain how negative feedback acts on bandwidth, distortion, Input Impedance and Output Impedance of a circuit.   8M

    b) The gain of an amplifier is decreased to 1000 with negative feedback from its gain of 5000. Calculate the feedback factor and the amount of negative feedback in dB   6M

AR16

CODE: 16CS2005   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, March-2022

FREE OPEN SOURCE SOFTWARE
(Common to CSE & IT)

Time: 3 Hours   **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	What is open source software? Discuss its need. List out the applications of and their advantages.	7M
	b)	Discuss about operators with Example?	7M
		(OR)	
2.	a)	Explain about Identifiers with Example?	7M
	b)	Discuss about variables with Example?	7M

UNIT-II

3.	a)	Explain about conditional statements with example?	7M
	b)	Explain the rules used for writing statements in Python .	7M
		(OR)	
4.	a)	Discuss about numbers with example?	7M
	b)	Explain about loops with Example?	7M

UNIT-III

5.	a)	What is a tuple? Why are tuples used?	7M
	b)	Explain about Lists with Example?	7M
		(OR)	
6.	a)	Explain about Dictionaries with Example?	7M
	b)	Discuss about Files and Input/output?	7M

UNIT-IV

7.	a)	Discuss the various Perl parsing rules with example.	7M
	b)	Give some of the elements and components within PERL? Illustrate it.	7M
		(OR)	
8.	a)	What is Perl? Explain various types of variables available in Perl.	7M
	b)	Discuss the following: (i) Features of Perl (ii) File handling in Perl (iii) Looping statement supported by PERL	7M

UNIT-V

9.	a)	What is Subroutine? How to pass arguments to the Subroutine?	7M
	b)	Give examples to illustrate the renaming, deleting and copying a file in Perl.	7M
		(OR)	
10.	a)	Discuss about packages with Example?	7M
	b)	Discuss in detail about Functions and Modules.	7M

AR16

CODE: 16EC2003 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, March-2022
SIGNALS AND SYSTEMS
(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Define the following basic signals with graphical representation 8M
   i) Unit Sample Signal ii) Unit Step Signal iii) Ramp Signal iv) Sinusoidal signal
   b) Explain how a function can be approximated by a set of orthogonal functions. 6M

   (OR)

2. a) Derive the expression for Mean square Error in approximating a function f(t) by a set of n 8M
   orthogonal functions.
   b) Compare Energy and power signals. 6M

UNIT-II

3. a) Justify the following with respect to Fourier series 6M
   i) Odd functions have only sine terms
   ii) Even functions have only cosine terms
   b) Find the Fourier Transform of the following signals. 8M
   (i) $x(t) = A \sin(2\pi \phi_c t) u(t)$ (ii) $x(t) = f(t) \cos(2\pi \phi_c t + \varphi) u(t)$

   (OR)

4. a) Find the trigonometric Fourier series for the periodic signal x(t) shown below 8M
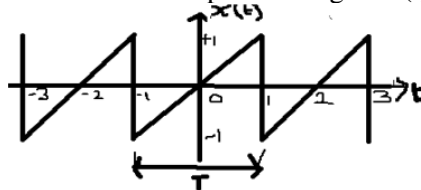
   b) State and prove time convolution and time differentiation properties of Fourier Transform. 6M

UNIT-III

5. a) Discuss about the distortion less transmission through an LTI system. 8M
   b) Discuss about the Causality and physical reliability of a system. 6M

   (OR)

6. a) Explain about LTI system by taking an example. 7M
   b) For the signal $g(t) = 2a/(t^2 + a^2)$, determine the essential Band width B Hz of g(t) such that 7M
   the energy contained in the spectral components of g(t) of frequencies below B Hz is 99%
   of signal energy Eg.

UNIT-IV

7. a) Find the convolution of $x(t) = e^{-2t} u(t)$ and $y(t) = e^{-4t} u(t)$ 7M
   b) List the properties of Cross correlation function. 7M

   (OR)

8. a) Give the relation between correlation and Convolution. 4M
   b) State and prove sampling theorem for band limited signals. 10M

UNIT-V

9. a) Find the inverse Laplace transform of $X[s] = \dfrac{1}{(s+5)(s+3)}$ for the following ROC's 8M

   i) $-5 < Re\{s\} < 3$ ii) $Re\{s\} > 3$
   b) State and prove initial value and final value theorems of Laplace transform 6M

   (OR)

10. a) Find the Laplace transform of the functions (i) x(t)=u(t) (ii) x(t)=sin ωt u(t) and indicate 7M
    the ROC.
    b) Find the Z-transform and ROC of the following 7M
    (i)$x(n)=a^n \cos \omega_0 n$ u(n) (ii) $x(n)=a^n \sin \omega_0 n$ u(n)

AR16

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, February,2022

ADVANCED ENGINEERING DRAWING
(Mechanical Engineering)

Time: 3 Hours   Max Marks: 70

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. A regular pentagonal pyramid of base 30 mm side and height   14 M
   100mm is rests on one edge of its base on the ground so that the
   highest point in the base is 30mm above the ground. Draw its
   projections when the axis is parallel to the vertical plane using
   AIP.

(OR)

2. Draw the projections of a line 80 mm long inclined at 300 to HP   14 M
   and its top view appears to be inclined at 600 to VP. One of the
   ends of the line is 45 mm above HP and 60 mm infront of VP.
   Draw its projections by auxiliary plane method

UNIT-II

3. A hexagonal prism, has a face on the H.P. and the axis parallel to   14 M
   the V.P. It is cut by a vertical section plane, the H. T. of which
   makes an angle of 45° with xy and which cuts the axis at a point
   20 mm from one of its ends. Draw its sectional front view and the
   true shape of the section. Side of base 25 mm long; height 65 mm

(OR)

4. A square pyramid, base 40 mm side and axis 65 mm long, has its   14 M
   base on the H.P. and all the edges of the base equally inclined to
   the V.P. It is cut by a section plane, perpendicular to the V.P.,
   inclined at 45° to the H.P. and bisecting the axis. Draw its
   sectional top view, sectional side view and true shape of the
   section.

UNIT-III

5. A cone of base diameter 80 mm and axis 100 mm is resting on its base on the HP. It is completely penetrated by a cylinder of base diameter 40 mm. The axes of the solids intersect each other at right angles, 30 mm above the base of the cone. Draw the projections of the combination and show curves of intersection   14 M

(OR)

6. A cylinder, 55 mm diarneter and 65 rnm long, has its axis parallel to both the H.P. and the V.P. It is cut by a vertical section plane inclined at 30° to the V.P., so that the axis is cut at a point 30 mm from one of its ends and both the bases of the cylinder are partly cut. Draw its sectional x front view and true shape of the section   14 M

UNIT-IV

7. A pipe 40 mm diameter and 120 mm long (along the axis) is welded to the vertical side of a tank. Show the development of the pipe, if it makes an angle of 60° with the side to which it is welded, the other end of the pipe making an angle of 30° with its own axis. Neglect thickness of the pipe.   14 M

(OR)

8. A cone of 90 mm diameter of base and 90 mm height stands on its base on the ground. A semi-circular hole of 50 mm diameter is cut through the cone. The axis of the hole is horizontal and intersects the axis of the cone. It is 30 mm above the base of the cone. The flat surface of the hole contains the axis of the cone and is perpendicular to the V.P. Draw three views of the cone and also develop the surface of the cone.   14 M

UNIT-V

9. A vertical square prism, base 50 mm side is completely penetrated by a horizontal square prism, base 35 mm side so that their axes are 6 mm apart. The axis of the horizontal prism is parallel to the V.P., while the faces of both prisms are equally inclined to the V.P. Draw the projections of the prisms showing lines of intersection.   14 M

(OR)

10. A vertical pipe of 60 mm diameter has a branch of 30 mm diameter. The axis of the branch is inclined at 45° to the ground, parallel to the V.P. and is 15 mm away from the axis of the main pipe. Draw the projections of the pipes showing the curve of intersection. Also, develop the surfaces of the two pipes, assuming any lengths.   14 M

AR13

CODE: 13CE2003   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, March-2022
ENGINEERING GEOLOGY
(Civil Engineering)

Time: 3 Hours   Max Marks: 70

PART-A
ANSWER ALL QUESTIONS   [1 x 10 = 10 M]
1. a) What is the importance of geology in Civil Engineering?
    b) What is meant by Weathering of Rocks?
    c) Write any four types of typical forms of Minerals?
    d) What is meant by Strike and Dip directions?
    e) Write the classification of Resistivity Methods?
    f) What are the main & allied branches of geology?
    g) Define Erosion and Denudation.
    h) Define Streak.
    i) What is a Fold? Name the parts of fold?
    j) Write the applications of Seismic Refraction Methods.

PART-B
Answer one question from each unit   [5x12=60M]

UNIT-I
2. What are the various branches of Geology and explain their relevance form Civil Engineering point of view.   12M

(OR)

3. Briefly explain the Geological causes for the failure of St. Francis Dam, Halesbar Dam and hafayetha Dam.   12M

UNIT-II
4. Distinguish between   12M
    (a) Granite and Dolerite.   (b) Sand stone and shale.
    (c) Quartzite and Basalt.   (d) Marble and slate.

(OR)

5. Write the various physical properties, chemical composition, atomic structure and uses of the following minerals.   12M
    (a) Quartz   (b) Olivene   (c) Magnetite
    (d) Kyanite.

UNIT-III
6. Describe the Classification of sedimentary rocks.   12M

(OR)

7. Explain the following: 12M
    (a) Classification of metamorphic rocks.
    (b) Explain the structures and textures of metamorphic rocks

UNIT-IV
8. Describe the different types of unconformities encountered in the nature. Draw neat sketches.   12M

(OR)

9. Write a note on the following: 12M
    (a) Anticline and syncline   (b) Similar and parallel folds
    (c) Open and closed folds   (d) Dome and Basin.

UNIT-V
10. What are types and applications of seismic refraction methods and explain?   12M

(OR)

11. Explain classification of geophysical methods.   12M

AR13

PART-A

ANSWER ALL QUESTIONS   **[1 x 10 = 10 M]**

1. a) When three capacitors 1F each are connected in series, what is the equivalent capacitance.
   b) A 100Ω resistance is directly switched on across a 10 V battery. What is the current through resistor?
   c) List and give the applications of different types of DC machines.
   d) What is the necessity of three-point starter in a dc motor?
   e) What are various losses in Transformer?
   f) In an Induction motor, slip is always Positive, Why?
   g) Define indicating instruments.
   h) Which type of signals are measured using Permanent magnet Moving coil instrument?
   i) What is an Ideal diode? Draw its characteristics.
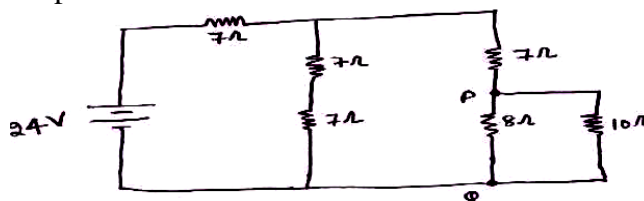   j) Difference between full wave and bridge rectifier.

PART-B

Answer one question from each unit   **[5x12=60M]**

UNIT-I

2. a) Find the voltage drop across the 10Ω resistor for the network shown below: 6M

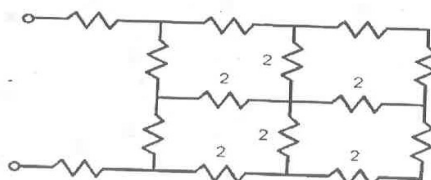

   b) Define and explain Kirchhoff's laws with example.   6M

(OR)

3. a) Classify different types of network elements.   6M
   b) Find the equivalent resistance R_{AB} 6M

UNIT-II

4. a) Explain the construction of DC Machine.   6M
   b) Derive the torque equation in DC motor.   6M

(OR)

5. a) Explain the construction and working of three-point starter. 6M
   b) A four-pole generator having wave-wound armature winding has 51 slots, each slot 6M
      containing 20 conductors. What will be the voltage generated in the machine when
      driven at 1500 rpm assuming the flux per pole to be 7.0 mWb?

UNIT-III

6. a) Explain about torque-slip characteristics in 3-Ø Induction motor. 6M
   b) Derive the e.m.f equation of a transformer. 6M

(OR)

7. a) With neat diagram explain the construction and working of Alternator. 6M
   b) Explain in detail about voltage regulation of transformer. 6M

UNIT-IV

8. With neat diagram explain the working of permanent magnet moving coil 12M
    instrument. Write the advantages and disadvantages of moving coil instrument

(OR)

9. a) Explain the required Torques used in Instruments 6M
   b) Classify different types of instruments. 6M

UNIT-V

10. a) Explain the working of a PN-junction diode. 6M
    b) Explain the working of transistor as an amplifier 6M

(OR)

11. Explain the working of bridge rectifier. 12M

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AR13

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, March-2022
ENGINEERING METALLURGY & MATERIAL SCIENCE
(Mechanical Engineerig)

Time: 3 Hours   Max Marks: 70

PART-A

ANSWER ALL QUESTIONS   **[1 x 10 = 10 M]**

1. a) What is Metallic Bond?
    b) What is Atomic packing factor?
    c) Define burger vector.
    d) What is an eutectoid reaction?
    e) List any two properties of gray cast iron.
    f) What are the constituents of the Hadfield Manganese steels?
    g) What is meant by fatigue?
    h) Define Toughness.
    i) List out various steps involved in P/M process.
    j) What is Impregnation ?

PART-B

Answer one question from each unit   **[5x12=60M]**

UNIT-I

2. a) Explain the Hume Rothery rules for maximum solid solubility?   6M
    b) Why are alloys produced? Explain why alloys find more applications than pure   6M
        metals.
                              (OR)
3. a) Distinguish between Edge and screw dislocations.   6M
    b) What is the importance of Miller indices? How does it help in the study of   6M
        crystallography?

UNIT-II

4.   With a neat sketch explain Iron-carbon equilibrium diagram showing all the   12M
        salient features. Also explain various reactions and micro constituents present in it.
                              (OR)
5. a) What is the importance of knowing lever rule.   6M
    b) Briefly explain the classification of phase diagrams based on the solubility in liquid   6M
        and solid states.

UNIT-III

6. a) Normalized steels are stronger than annealed steels. Explain.   4M
    b) Draw TTT diagram for a eutectoid steel and explain the effect of cooling rate on   8M
        the transformation products obtained.

7. a) Write a short note on: (i) Hardening   and   ii) Tempering.   4M
   b) Give manufacturing method, properties, microstructure, and applications of Grey   8M
      cast iron.

UNIT-IV

8. Explain stress strain curve of a mild steel and Explain different points ?   12M
   Also differentiate between true stress and engineering stress with an example.
   (OR)
9. Define the following properties with examples: i)   12M
   Compressive strength   ii)Malleability   iii)Hardness and iv)Brittleness
   ## UNIT-V

10. Explain any four methods of manufacturing methods of Metal Powders ?   12M
    (OR)
11. a) Define powder metallurgy and explain design considerations and stages in powder   8M
       metallurgical components preparation?
    b) Why is the particle size distribution important in the packing of powders?   4M

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AR13

Time: 3 Hours   Max Marks: 70

PART-A

ANSWER ALL QUESTIONS   [1 × 10 = 10 M]

1. a) What is Hall voltage.
   b) Describe Einstein relationship.
   c) What is Mass Action law.
   d) What is transition capacitance?
   e) Express temperature dependence of reverse saturation current.
   f) Define the regulation of a rectifier.
   g) Express input impedance of CE amplifier in h parameters.
   h) What is pinch off voltage?
   i) Define sensitivity.
   j) What is frequency of FET phase shift oscillator?

PART-B

Answer one question from each unit   **[5×12=60M]**

UNIT-I

2. a) What is Hall Effect? Explain the phenomenon with the aid of   6M
      Lorentz force law.
   b) Define the terms mobility and conductivity. Give their   6M
      dimensions.

(OR)

3. a) Derive volt-ampere characteristic of a $_{P-N}$ junction diode.   6M
      Explain the temperature dependence of volt-ampere
      characteristic of diode.
   b) Give a brief description of dynamic resistance of diode   6M

UNIT-II

4. a) Mention different types of breakdown diodes and give a   6M
      detailed account of their applications.
   b) Describe the special features of tunnel diode? Explain how it   6M
      is able to provide dynamic negative resistance.

(OR)

5. a) Draw the circuit diagram of a half-wave rectifier circuit. Explain its functioning with the help of neatly drawn sinusoidal waveforms.　　6M

   b) Calculate (i) peak load current (ii) dc load current (iii) ac load current (iv) percentage regulation from no load to the given load (v) the efficiency of rectification when the diode with an internal resistance of 25Ω is to supply power to a 150Ω load from 110V (rms) source of supply.　　6M

UNIT-III

6. a) Sketch the current components in various layers of BJT and explain their origin.　　6M

   b) Describe the characteristics, input as well as the output, of BJT in CB configuration.　　6M

(OR)

7. a) Differentiate the functioning of Enhancement MOSFETs and Depletion MOSFETs.　　6M

   b) Using the low frequency model of FET, analyze Common Source and Common Drain amplifier　　6M

UNIT-IV

8. a) Define and differentiate (i) stabilization techniques and (ii) compensation techniques.　　6M

   b) Draw a circuit that uses a diode compensation for changes in base voltage and collectors reverse saturation current.　　6M

(OR)

9. a) Develop small signal equivalent circuits of BJT for all its three configurations using h-parameters.　　6M

   b) Sketch the h-parameter equivalent circuits of BJT for all its three configurations and write down the conversion relations of h-parameters.　　6M

UNIT-V

10. a) Draw the block diagram of a typical feedback amplifier. Name and identify each block stating its function.　　6M

    b) Give a proof to show that series mixing increases input resistance and shunt mixing reduces it.　　6M

(OR)

11. a) List general characteristics of phase shift oscillators and explain how tuning is accomplished in these oscillators. Why they are limited to low frequency applications?　　6M

    b) Draw the circuit diagram of RC phase-shift oscillator and obtain an expression for its frequency of oscillation.　　6M

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