

R19

III B.TECH II SEM

SUPPLEMENTARY EXAMINATIONS

MARCH / APRIL 2024



NARASARAOPETA ENGINEERING COLLEGE (AUTONOMOUS)

III B.Tech II Semester Supple. Examinations, March-2024

Sub Code: 19BCE6TH04 TRANSPORTATION ENGINEERING

Time: 3 hours

(CE)

Max. Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No	Questions	KL	CO	M	
1	a	Describe the requirements of ideal highway alignment.	K2	1	6
		Explain in detail about second twenty-year road development plan.	K2	1	6
	(OR)				
	b	Illustrate the various surveys used in highway engineering.	K2	1	6
Discuss the classification of urban roads with a neat		K2	1	6	
2	a	Calculate the stopping sight distance required to avoid head on collision of two cars approaching from opposite directions at a speed of 75 kmph and 85 kmph. Assume that the reaction time of drivers is 2.5 sec and the co-efficient of friction between road surface and tyres are 0.4.	K3	2	12
		(OR)			
	b	A national highway passing through a flat terrain has a horizontal curve of radius equal to the ruling minimum radius. If the design speed is 100 kmph, calculate absolute minimum sight distance, superelevation and length of transition curve. Assume necessary data suitably.	K3	2	12
		(OR)			
3	a	Explain the types of intersections in traffic engineering with neat sketches.	K2	3	12
	b	Discuss the concept and procedure for design of traffic signals using Webster method and IRC method.	K2	3	12
4	(OR)				
	a	Elucidate the CBR method of design for flexible pavements.	K2	4	6
		Describe how impact value of aggregate is found in laboratory.	K2	4	6
	(OR)				
b	Elaborate the IRC method of design for rigid pavements.	K2	4	6	
	Briefly explain the softening point test on bitumen with neat sketch.	K2	4	6	
5	a	Discuss briefly the different types of failures in rigid pavements.	K2	5	6
		Elaborate the importance of highway maintenance.	K2	5	6
	(OR)				
	b	Illustrate the various methods of pavement evaluation.	K2	5	6
Write a detailed note on Water Bound Macadam Roads with neat sketch.		K2	5	6	

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

III B.Tech II Semester Supple. Examinations, March-2024

Sub Code: 19BCE6TH02 IRRIGATION & WATER RESOURCES ENGINEERING

Time: 3 hours

(CE)

Max. Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No	Questions	KL	CO	M																																								
UNIT-I																																												
1	a	Explain "Hydrological cycle" with neat sketch.																																										
	b	Determine optimum number of rain gauges in catchment area from following data: No. of existing rain gauge = 7 Mean annual rain fall at the gauges are 1010, 980, 900, 870, 850, 800, 700 mm. Permissible error = 8 %																																										
		(OR)																																										
		The rain fall recorded at the various rain gauge stations are as follows:																																										
		K3	1	6																																								
		<table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Rain gauge station number</th> <th style="width: 50%;">Precipitation in mm</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">1</td><td style="text-align: center;">35</td></tr> <tr><td style="text-align: center;">2</td><td style="text-align: center;">38</td></tr> <tr><td style="text-align: center;">3</td><td style="text-align: center;">41</td></tr> <tr><td style="text-align: center;">4</td><td style="text-align: center;">45</td></tr> <tr><td style="text-align: center;">5</td><td style="text-align: center;">47</td></tr> <tr><td style="text-align: center;">6</td><td style="text-align: center;">50</td></tr> <tr><td style="text-align: center;">7</td><td style="text-align: center;">52</td></tr> <tr><td style="text-align: center;">8</td><td style="text-align: center;">55</td></tr> </tbody> </table>			Rain gauge station number	Precipitation in mm	1	35	2	38	3	41	4	45	5	47	6	50	7	52	8	55																						
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		K2	1	6																																								
UNIT-II																																												
2	a	Discuss the process of evapotranspiration and its measurement.																																										
(OR)																																												
	b	Illustrate the process of infiltration and factor affecting its process.																																										
		K2	2	12																																								
UNIT-III																																												
	a	A small watershed is 250 ha in size has group C Soil. The land cover can be classified as 30% open forest and 70% of poor-quality pasture. Assuming AMC at average condition and the soil to be black soil. Estimate the direct runoff volume due to a rainfall of 75 mm in one day.																																										
		K3	3	12																																								
(OR)																																												
3	b	For a catchment area of 230 km ² the discharge in stream is given below. Calculate unit hydrograph ordinates and rainfall excess.																																										
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UNIT-IV					
4	a	List and describe the main crop seasons of India.	K2	4	6
		Explain in detail about irrigation efficiencies.	K2	4	6
	(OR)				
	b	Derive the relationship between Duty and Delta for the given base period.	K2	4	6
With a neat sketch, explain the modes of applying water to crops.		K2	4	6	
UNIT-V					
5	a	Explain various storage zones of reservoir with neat sketch.	K2	5	6
		What is meant by reservoir sedimentation? Describe in detail.	K2	5	6
	(OR)				
	b	What are the factors for selection of site for a dam? Discuss in detail.	K2	5	6
Elaborate the various types of dams.		K2	5	6	

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

III B.Tech II Semester Supple. Examinations, March-2024

Sub Code: 19BCE6TH03

FOUNDATION ENGINEERING

Time: 3 hours

(CE)

Max. Marks: 60

Note: Answer All FIVE Questions. All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No	Questions	KL	CO	M	
1	a	i) What do you understand by significant depth of soil exploration?	K2	1	[6M]
	a	ii) Write short note on bore log report with neat sketch.	K2	1	[6M]
	OR				
	b	i) Explain briefly Standard penetration test.	K2	1	[6M]
	b	ii) Explain finite and infinite slopes.	K2	1	[6M]
2	a	A retaining wall with smooth vertical back is 8m high and retains a two layer sand back fill. The top layer is 3m high having $\phi=30^\circ$ and $\gamma=20$ kN/m ³ . The bottom layer is 5m having $\phi=35^\circ$ and $\gamma=22$ kN/m ³ . Determine the total active earth pressure and point of its application.	K2	2	[12M]
	OR				
	b	i) Give comparison of Rankine's and Coulomb's theory.	K2	2	[6M]
	b	ii) Describe the Culmann's graphical method of determining the active earth pressure in cohesion less soils.	K2	2	[6M]
3	a	i) write the design considerations for retaining walls in detailed.	K3	3	[4M]
	a	ii) A retaining wall 4.5 m high with a vertical back supports a horizontal fill weighing 18.60 kN/m ² and having $\phi = 32^\circ$, $\delta = 20^\circ$ and $c = 0$. Determine the total active thrust on the wall weighing by Culmann's graphical method.	K3	3	[8M]
	OR				
	b	i) Discuss the factors affecting bearing capacity of shallow foundations	K3	3	[4M]
	b	ii) A strip footing, 1 m wide, rests on the surface of a dry cohesion less soil having $\phi = 25^\circ$ and $\gamma = 18$ kN/m ³ . What is the ultimate bearing capacity? What is the value, if there is complete flooding? Assume $N_\gamma = 10$.	K3	3	[8M]
4	a	i) Explain different classifications of piles with neat sketches.	K2	4	[4M]
	a	ii) A group of 16 piles of 50 cm diameter is arranged with a centre to centre spacing of 1.0 m. The piles are 9 m long and are embedded in soft clay with cohesion 30 kN/m ² . Bearing resistance may be neglected for the piles. Negative adhesion factor is 0.6. Determine the ultimate load capacity of the pile group	K3	4	[8M]
	OR				
	b	i) What is a negative skin friction?	K2	4	[4M]
	b	ii) A precast concrete pile is driven by a single acting hammer of weight 15 kN with a free fall of 900 mm. The final set, the average of the last three blows, is 27.5 mm. Estimate the safe load using Engineering News Record formula (F.O.S = 6).	K3	4	[8M]

5	a	i) Write about Methods to reduce differential settlements in detailed.	K2	5	[6M]
		ii) What is tilt and shift in well foundations?	K2	5	[6M]
	OR				
	b	What is grip length with respect to well foundations? Explain with a neat sketch different forces acting on well foundations and construction and Sinking of wells	K2	5	[12M]

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

III B.Tech II Semester Supple. Examinations, March-2024

Sub Code: 19BME6TH01 COMPLEX VARIABLES, PROBABILITY STATISTICS

Time: 3 hours

(ME)

Max. Marks: 60

Note: Answer All FIVE Questions. All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No	Questions	KL	CO	M
Unit-I				
1	a i) Estimate the value of k such that $f(z) = e^x \cos ky + i \sin ky $ is analytic.	2	1	6M
	ii) Show that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right) \log f'(z) = 0$, where $f(z)$ is an analytic function.	3	1	6M
	OR			
	b i) Show that the function $f(z) = \begin{cases} \frac{x^3 y y - ix }{x^6 + y^2}, & z \neq 0 \\ 0, & z = 0 \end{cases}$ is not differentiable at the origin.	2	1	6M
	ii) Find k such that $f(x, y) = x^3 + 3kx y^2$ may be harmonic and find its conjugate.	2	1	6M
Unit-II				
2	a i) Verify Cauchy's theorem for the function $f(z) = 3z^2 + iz - 4$ if c is the square with vertices at $1 \pm i$ and $-1 \pm i$.	3	2	12M
	OR			
	i) Expand $\frac{1}{z^2 - z - 6}$ in Taylor's series about $z = -1$	1	2	6M
	b ii) Using Residue Theorem, Determine $\oint_C \frac{2e^z}{z(z-3)} dz$ where C is $ z = 2$.	2	2	6M
Unit-III				
3	a i) Three machines 1, 2, 3 produce 40%, 30%, 30% of the total number of items of factory. The percentage of defective items of these machines is 4%, 2%, 3%. (a) If an item is selected at random, find the probability that the item is defective. (b) What is the probability that the defective item is drawn from machine 3.	3	3	6M
	ii) A random variable X has the density function: $f(x) = \begin{cases} k \frac{1}{1+x^2}, & -\infty < x < \infty \\ 0, & \text{otherwise} \end{cases}$ Determine k and the distribution function?	2	3	6M
	OR			
	b i) If the probability that a new born child is a male is 0.6, find the probability that in a family of 5 children there are exactly 3 boys. ii) The mean and standard deviation of the marks obtained by 1000 students in an examination are respectively 34.5 and 16.5. Assuming the normality of the distribution, find the approximate number of students expected to obtain marks between 30 and 60.	3	3	6M
		2	3	6M

Unit-IV

4	a	i) If a 1-gallon can of paint covers on the average 513 square feet with a standard deviation of 31.5 square feet, what is the probability that the sample mean area covered by a sample of 40 of these 1-gallon cans will be anywhere from 510.0 to 520.0 square feet?	2	4	6A
		ii) A random sample of size 100 has a standard deviation of 5. What can you say about the maximum error with 95% confidence?	1	4	6B

OR

4	b	i) In a random sample of 400 industrial accidents, it was found that 231 were due to at least partially to unsafe working condition. Construct 99% confidence interval for the corresponding true proportion using the large sample confidence interval formula.	2	4	6A
		ii) In a study of an automobile insurance a random sample of 80 body repair costs had a mean of Rs.472.36 and the Standard deviation of Rs.62.35. If \bar{x} is used as a point estimate to the true average repair cost, with what confidence we can assert that the maximum error doesn't exceed Rs.10?	2	4	6B

Unit-V

5	a	i) The dynamic modulus of concrete is obtained for two different concrete mixes. For the first mix, $n_1 = 33, \bar{x} = 115.1$ and $s_1 = 0.47$ psi. For the second mix $n_2 = 31, \bar{y} = 114.6$ and $s_2 = 0.38$ psi. Test with $\alpha = 0.05$, the null hypothesis of equality of mean dynamic modulus versus the two-sided alternative.	3	5	6A
		ii) In a city 250 men out of 750 were found to be smokers. Does this information support the conclusion that the majority of men in this city are smokers?	2	5	6B

OR

5	b	i) The following are the number of sales which a sample of 9 sales people of industrial chemicals in California and a sample of 6 sales people of industrial chemicals in Oregon made over a certain fixed period of time:	3	5																					
		<table border="1"> <tr> <td>California:</td> <td>59</td> <td>68</td> <td>44</td> <td>71</td> <td>63</td> <td>46</td> <td>69</td> <td>54</td> <td>48</td> </tr> <tr> <td>Oregon:</td> <td>50</td> <td>36</td> <td>62</td> <td>52</td> <td>70</td> <td>41</td> <td></td> <td></td> <td></td> </tr> </table> <p>Assuming that the populations sampled can be approximately closely with normal distributions having the same variance, test the null hypothesis $\mu_1 - \mu_2 = 0$ against the alternative hypothesis $\mu_1 - \mu_2 \neq 0$ at the 0.01 level of significance.</p>				California:	59	68	44	71	63	46	69	54	48	Oregon:	50	36	62	52	70	41			
California:	59	68	44	71	63	46	69	54	48																
Oregon:	50	36	62	52	70	41																			
		ii) From the following data find whether there is any significant liking in the habit of taking soft drinks among the categories of employees.	3	5																					
		<table border="1"> <thead> <tr> <th></th> <th colspan="3">Employees</th> </tr> <tr> <th>Soft drinks</th> <th>Clerks</th> <th>Teachers</th> <th>Officers</th> </tr> </thead> <tbody> <tr> <td>Pepsi</td> <td>10</td> <td>25</td> <td>65</td> </tr> <tr> <td>Thumsup</td> <td>15</td> <td>30</td> <td>65</td> </tr> <tr> <td>Fanta</td> <td>50</td> <td>60</td> <td>30</td> </tr> </tbody> </table>					Employees			Soft drinks	Clerks	Teachers	Officers	Pepsi	10	25	65	Thumsup	15	30	65	Fanta	50	60	30
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Thumsup	15	30	65																						
Fanta	50	60	30																						

III B.Tech II Semester Supple. Examinations, March-2024

Sub Code: 19BME6TH02 DESIGN OF MACHINE ELEMENTS-II

Time: 3 hours

(ME)

Max. Marks: 60

Note: Answer All FIVE Questions. All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No	Questions	KL	CO	M	
1	Unit-I				
	a	i) A bearing, 50 mm in diameter and 75 mm in length supports an overhanging shaft, running at 900 r.p.m. the room temperature is 30°C, and the bearing temperature is 75°C. The viscosity of the oil used is 0.012 kg/m-s at the operating temperature of 120°C. The diametral clearance is 0.05 mm, and the bearing is to operate in still air, without any artificial cooling. Determine i) the permissible load on the bearing, and ii) power loss	K5	CO1	6M
		ii) Explain design of ball bearings	K4	CO1	6M
	OR				
	b	i) Differentiate between hydrostatic lubrication and hydro dynamic bearing lubrication	K4	CO1	6M
	ii) A shaft of 150 mm diameter is supported in a foot step bearing which is counter bored at the end with a hole diameter of 50 mm. the speed of the shaft is 100 rpm and the allowable bearing pressure is 0.8 N/mm ² . Determine the load which can be supported, power lost in friction and heat generated in bearing. Assume $\mu = 0.015$.	K5	CO1	6M	
2	Unit-II				
	a	Design the connecting rod for a petrol engine, from the following data: Diameter of the piston = 110 mm Mass of the reciprocating parts = 2 kg Length of the connecting rod = 325 mm Stroke length = 150 mm Speed = 1500 r.p.m, with permissible over speed of 2500 r.p.m Compression ratio = 4 Maximum explosion pressure = 2.5 N/mm ² .	K5	CO2	12M
	OR				
b	i) At what angle, the twisting moment is maximum in the crank shaft? Explain	K4	CO2	6M	
	ii) In an overhung crank, the axial distance between the axis of the crankshaft journal and the crank pin is 350 mm, and the length of the crank is 450 mm. if the maximum tangential force acting on the crank pin is 100 kN; design the crank pin. Take the safe bearing pressure as 6 MPa, and bending stress as 60 MPa. Determine the diameter of the crankshaft, if the principal stress is limited to 60 MPa.	K5	CO2	6M	
3	Unit-III				
a	Design a cast iron piston for a four stroke I.C engine, for the following specifications: Cylinder bore = 120 mm, Stroke length = 150 mm Maximum gas pressure = 5 Mpa, Brake mean effective pressure = 0.7 MPa Fuel consumption = 0.25 kg/kW/hr, Speed = 2400 r.p.m Assume any other data necessary for the design	K5	CO3	12M	

		OR			
	b	i) Design a cylinder of an 1100 CC six-cylinder car engine with the following data: power 40 kW at 4400 rpm and mean effective pressure is 1 N/mm ²	K5	CO3	6M
		ii) Explain in detail about the material of piston rings	K3	CO3	6M
		Unit-IV			
	a	Derive an expression for radius of neutral axis for circular section.	K4	CO4	12M
		OR			
4	b	i) Derive the bending moment equation of the beam with a sketch and write its assumptions	K4	CO4	6M
		ii) A rectangular bar 50 mm wide by 75 mm deep is bent into a circular form with the plane of the arc parallel to its depth, the radius of curvature being 100 mm. If the bar is now subjected to a bending moment of 37.5 N-m tending to decrease its curvature, draw the stress distribution diagram of the section.	K5	CO4	6M
		Unit-V			
	a	Design a chain drive to actuate a compressor from 15 kW electric motor running at 1000 RPM, the compressor speed being 350 RPM, the minimum centre distance is 500 mm; the compressor operates 16 hours per day. The chain tension may be adjusted by shifting the motor on slides	K5	CO5	12M
		OR			
5	b	i) A flat belt running on a pulley of diameter 1m transmits 7.5 kW at 200 rpm $\mu = 0.25$, diameter of smaller pulley = 225mm and Centre distance = 1.5 m. Find the necessary width of the belt if the pull should not exceed 20 N/mm. Neglect C.F. tension.	K5	CO5	6M
		ii) Write down the Advantages and Disadvantages of V-belt Drive over Flat Belt Drive	K4	CO5	6M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

III B.Tech II Semester Supple. Examinations, March-2024

Sub Code: 19BEC6PE05

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

(ECE)

Max. Marks: 60

Time: 3 hours

Note: Answer All FIVE Questions. All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No	Questions	KL	CO	M			
Unit-I							
1	a	i) Describe the classification of errors and explain them			K4	CO1	6M
		ii) Explain the dynamic characteristics of measurement systems?			K4	CO1	6M
	OR						
	b	i) Explain the dynamic response of a second order instrument			K4	CO1	6M
ii) Explain the static characteristics of measurement systems?			K4	CO1	6M		
Unit-II							
2	a	Describe the construction and working of LVDT And Explain the significance of load cell in static and dynamic force measurement			K4	CO2	12M
		OR					
	b	i) Explain the working of capacitive transducers.			K4	CO2	6M
		ii) Explain the principle of operation of strain gauges with the help of neat diagrams.			K4	CO2	6M
Unit-III							
3	a	i) Draw the Schering's bridge and discuss the measurement of unknown capacitance.			K4	CO3	6M
		ii) Describe how the unknown frequency is measured using Wein's bridge method?			K4	CO3	6M
	OR						
	b	i) Explain Anderson bridge with vector diagram and also derives balance Equation			K4	CO3	6M
ii) Explain the principle and working of Q-meter			K4	CO3	6M		
Unit-IV							
4	a	i) Describe briefly about Harmonic distortion analyzer			K4	CO4	6M
		ii) Describe the working of a function generator with a neat block diagram			K4	CO4	6M
	OR						
	b	i) Describe the circuits and working of wave analyzers used for audio frequency and megahertz range			K3	CO4	6M
ii) Draw the block diagram of random noise generator and explain with neat waveforms			K4	CO4	6M		
Unit-V							
5	a	i) Analyze the operation of vertical amplifier used in a CRO			K3	CO5	6M
		ii) A Barium Titanite pickup has the dimensions of 5mmX5mmX1.25mm. The acting force is 5N. The charge sensitivity of the material is 150pc/N and permittivity is 12.5×10^{-9} F/m. If the modulus of elasticity of material is 12×10^6 N/m ² , calculate the strain, charge and capacitance			K3	CO5	6M
	OR						
	b	i) Explain the operation of XY Recorders			K3	CO5	6M
ii) Describe the working of a triggered sweep CRO with a neat diagram.			K3	CO5	6M		

III B.Tech II Semester Supple. Examinations, March-2024

Sub Code: 19BME6TH04

DYNAMICS OF MACHINERY

Time: 3 hours

(ME)

Max. Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No	Questions	KL	CO	M	
1	Unit-I				
	a	i) Explain the reactive gyroscopic couple on an aeroplane, when the engine or propeller rotates in anti clockwise direction when viewed from the front, the aeroplane takes a right turn.	2	1	6M
		ii) An aeroplane makes a complete half circle of 50 metres radius, towards left, when flying at 200 km per hr. The rotary engine and the propeller of the plane has a mass of 400 kg and a radius of gyration of 0.3 m. The engine rotates at 2400 r.p.m. clockwise when viewed from the rear. Find the gyroscopic couple on the aircraft and state its effect on it.	3	1	6M
	OR				
		i) Describe the effect of gyroscopic couple on a naval ship during steering taking left turn.	2	1	6M
	b	ii) The heavy turbine rotor of a sea vessel rotates at 1500 r.p.m. clockwise looking from the stern, its mass being 750 kg. The vessel pitches with an angular velocity of 1 rad/s. Determine the gyroscopic couple transmitted to the hull when bow is rising, if the radius of gyration for the rotor is 250 mm. Also show in what direction the couple acts on the hull?	3	1	6M
2	Unit-II				
	a	i) A single plate clutch, with both sides effective, has outer and inner diameters 300 mm and 200 mm respectively. The maximum intensity of pressure at any point in the contact surface is not to exceed 0.1 N/mm ² . If the coefficient of friction is 0.3, determine the power transmitted by a clutch at a speed 2500 r.p.m.	3	2	6M
		ii) Derive from first principles an expression for the friction moment of a conical pivot assuming (a) Uniform pressure, and (b) Uniform wear.	2	2	6M
	OR				
b	i) A band brake acts on the 3/4 th of circumference of a drum of 450 mm diameter which is keyed to the shaft. The band brake provides a braking torque of 225 N-m. One end of the band is attached to a fulcrum pin of the lever and the other end to a pin 100 mm from the fulcrum. If the operating force is applied at 500 mm from the fulcrum and the coefficient of friction is 0.25, find the operating force when the drum rotates in the (a) anticlockwise direction, and (b) clockwise direction.	3	2	12M	
3	Unit-III				
		i) Explain the working of a porter governor with neat sketch.	2	3	6M
	a	ii) A Proell governor has equal arms of length 300 mm. The upper and lower ends of the arms are pivoted on the axis of the governor. The extension arms of the lower links are each 80 mm long and parallel to the axis when the radii of rotation of the balls are 150 mm and 200 mm. The mass of each ball is 10 kg and the mass of the central load is 100 kg. Determine the range of speed of the governor.	3	3	6M
	OR				
b	i) Explain the working of a Hartnell governor with neat sketch.	2	3	6M	

		ii) A Porter governor has equal arms each 250 mm long and pivoted on the axis of rotation. Each ball has a mass of 5 kg and the mass of the central load on the sleeve is 25 kg. The radius of rotation of the ball is 150 mm when the governor begins to lift and 200 mm when the governor is at maximum speed. Find the minimum and maximum speeds and range of speed of the governor.	3	3	6M
4	Unit-IV				
	a	i) Explain the method of balancing of different masses revolving in the same plane.	2	4	6M
		ii) How the different masses rotating in different planes are balanced?	2	4	6M
	OR				
b	i) Four masses m_1, m_2, m_3 and m_4 having 100, 175, 200, and 25kg fixed to cranks of 20cm radius and revolve in places 1, 2, 3 and 4. The angular position of the cranks in planes 2, 3 and 4 with respect to the crank in plane 1 are 75° same sense. The distances of planes 2, 3 and 4 from plane 1 are 60cm, 186cm and 240cm respectively. Determine the position and magnitude of the balance mass at a radius of 60cm in plane L and M located at the middle of the plane 1 and 2 and the middle of the planes 3 and 4 respectively.	3	4	12M	
5	Unit-V				
	a	i) Derive the following expression of effects of partial balancing in two cylinder locomotive engine (i) Variation of tractive force, (ii) Swaying couple and (iii) Hammer blow.	3	5	12M
	OR				
b	i) An inside cylinder locomotive has its cylinder centre lines 0.7 m apart and has a stroke of 0.6 m. The rotating masses per cylinder are equivalent to 150 kg at the crank pin and the reciprocating masses per cylinder to 180 kg. The wheel centre lines are 1.5 m apart. The cranks are at right angles. The whole of the rotating and $\frac{2}{3}$ of the reciprocating masses are to be balanced by masses placed at a radius of 0.6 m. Find the magnitude and direction of the balancing masses. Find the fluctuation in rail pressure under one wheel, variation of tractive effort and the magnitude of swaying couple at a crank speed of 300 r.p.m.	3	5	12M	

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

III B.Tech II Semester Supple. Examinations, March-2024

Sub Code: 19BEC6TH02 DIGITAL SIGNAL PROCESSING

Time: 3 hours

(ECE)

Max. Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No	Questions	KL	CO	M	
Unit-I					
1	a	i) Define the basic operations time shifting and time reversal with the help of a sequence.	I	1	6M
		ii) State and prove any two properties of DTFT.	II	1	6M
	OR				
	b	i) Find whether the signal $x(n)=\cos(2\pi n/3)+\cos(2n/5)$ is periodic or not? And also check whether the following system is time invariant or not $y(n+2)+2y(n) = x(n+1)+2$	II	1	6M
	ii) Find out the Total response of the system described by difference equation $y(n)+2y(n-1)+y(n-2)=x(n)+x(n-1)$ for the input $x(n)= 1/2 ^n u(n)$ and $y(-1)=y(-2)=1$.	II	1	6M	
Unit-II					
2	a	Find the DFT of the following sequence using DIF- FFT? $X(n) = \{1,2,3,5,5,3,2,1\}$	II	2	12 M
	OR				
	b	i) Find out the IDFT of the sequence $X(k)=[1,1-2j,-1,1+j2]$ using DIT-FFT algorithm.	II	2	6M
	ii) Find 4-point D.F.T. of the sequence $x(n)=\{1,2,3,4\}$ using DIF-FFT algorithm.	II	2	6M	
Unit-III					
3	a	i) Realise the following IIR system functions in the Direct Form-II. $y(n)=0.6y(n-1)+0.25y(n-2)+3x(n)+3.6x(n-1)+0.98x(n-2)$	II	3	6M
		ii) Realise the following IIR system functions in the parallel form $y(n)=-0.1y(n-1)+0.72y(n-2)+0.7x(n)-0.252x(n-2)$.	II	3	6M
	OR				
	b	i) Determine the cascade and parallel form realization of the transfer function $H(z)=3(z^2+5z+4)/[(2z+1)(z+2)]$	III	3	6M
	ii) Realize the system with difference equation $y(n)=0.75y(n-1)-0.125y(n-2)+x(n)+0.33x(n-1)$ in cascade form	III	3	6M	
Unit-IV					
4	a	i) Convert the analog filter to digital filter whose system function is $H(S)=\frac{1}{(s+2)^2+(s+1)}$ using bilinear transformation.	III	4	6M
		ii) Design a Chebyshev filter with a maximum pass band attenuation of 2 dB; at $\Omega_p=20\text{rad/sec}$ and the stop band attenuation of 35 dB at $\Omega_s=50\text{ rad/sec}$	III	4	6M
	OR				
	b	i) Given the specifications $\alpha_p=1\text{dB},\alpha_s=30\text{dB}, \Omega_p =200\text{rad/sec}; \Omega_s= 600\text{rad/sec}$ Determine the order and transfer function of the butterworth filter.	III	4	6M
	ii) Given the specifications $\alpha_p=3\text{dB},\alpha_s=16\text{dB},f_p=1\text{KHz}$ and $f_s=2\text{KHz}$. Determine the order of the filter using chebyshev approximation .Find $H(s)$.	III	4	6M	

Unit-V					
5	a	Design an ideal high pass filter with a frequency response. Find the values of $h(n)$ for $N = 11$ using Hamming window. Find $H(z)$ and determine the magnitude response.	III	5	12 M
	OR				
	b	i) Discuss the different types of window techniques to design FIR filters? ii) Illustrate the frequency domain characteristics of Hamming window	II II	5 5	6M 6M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

III B.Tech II Semester Supple. Examinations, March-2024

Sub Code: 19BEC6TH03 MICRO CONTROLLERS AND EMBEDDED SYSTEMS

Time: 3 hours

(ECE)

Max. Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No	Questions	KL	CO	M	
Unit-I					
1	a	i) Draw and comment about the internal architecture of 8051 in detail?	K5	1	6M
		ii) Correlate the different types of timers in 8051.	K4	1	6M
	OR				
	b	i) Examine about the RAM & ROM Organization of 8051	K3	1	6M
ii) Validate the different Address Modes of 8086 with suitable examples		K5	1	6M	
Unit-II					
2	a	Design and explain interfacing of Seven Segment display with 8051 micro controller	K6	2	12M
		OR			
	b	i) Draw and explain the DAC interfacing using 8051.	K2	2	6M
		ii) Explain the keyboard interfacing using 8051	K2	2	6M
Unit-III					
3	a	i) Justify how ARM instruction set is suitable for embedded applications.	K5	3	6M
		ii) Compare various ARM processor families.	K4	3	6M
	OR				
	b	i) Draw and explain the ARM family core architecture.	K2	3	6M
ii) Explain Thumb instruction set based branch instructions of ARM processor with an example.		K2	3	6M	
Unit-IV					
4	a	i) Distinguish between embedded system and general computing system.	K4	4	6M
		ii) Articulate the characteristics of embedded systems?	K3	4	6M
	OR				
	b	i) Explain in detail about classification of embedded system with suitable examples.	K2	4	6M
ii) Discuss in detail about the Non-operational quality attributes for an embedded system		K2	4	6M	
Unit-V					
5	a	i) Write in detail about Super – Loop based approach for an ES?	K3	5	6M
		ii) Deduce the importance of watchdog timer and Explain about it with neat diagrams?	K4	5	6M
	OR				
	b	i) Explain the concept of embedded operating system approach for an ES?	K2	5	6M
ii) Justify the importance of I2C bus communication interface in embedded systems with neat diagrams		K5	5	6M	

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

III B.Tech II Semester Supple. Examinations, March-2024

Sub Code: 19BEC6TH04 OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Time: 3 hours

(ECE)

Max. Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No	Questions	KL	CO	M	
Unit-I					
1	a	i) What are the Principles of Object-Oriented Programming? Explain with examples.	KL2	CO1	6M
		ii) Demonstrate the Java Features in detail	KL2	CO1	6M
	OR				
	b	i) What is Data Encapsulation? Explain the types of Inheritance supported by Java.	KL2	CO1	6M
		ii) Distinguish between Procedural languages and Object-Oriented Programming.	KL2	CO1	6M
	Unit-II				
2	a	Explain the concept of method overloading and method overriding with example Java program.	KL2	CO2	12M
	OR				
	b	i) Define Constructor. Explain the types of constructors with example.	KL2	CO2	6M
		ii) What are the Data types used in java. Write a java program to show the use of each datatype?	KL2	CO2	6M
Unit-III					
3	a	i) What is Inheritance? Explain how multiple inheritance is achieved in java.	KL4	CO3	12M
	OR				
	b	i) Explain different types of Exception handling techniques in detail.	KL4	CO3	6M
		ii) Discuss the use of super keyword with example program.	KL3	CO3	6M
Unit-IV					
4	a	i) What is a thread? Explain Thread life cycle.	KL3	CO4	6M
		ii) Demonstrate the use of final key word in Java program with sample code.	KL3	CO4	6M
	OR				
	b	i) Demonstrate the concept of inter-thread communication with an example program.	KL3	CO4	6M
	ii) Explain the use of isAlive() and join() with example program.	KL3	CO4	6M	

Unit-V					
5	a	i) What is an Applet? Explain Applet Life Cycle.	KL2	CO5	6M
		ii) Demonstrate in brief about Events, Event sources and Event classes.	KL3	CO5	6M
	OR				
	b	i) Explain in detail about different Layout managers.	KL2	CO5	6M
ii) Demonstrate the mouse related events with java program.		KL3	CO5	6M	

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

III B.Tech II Semester Supple. Examinations, March-2024

Sub Code: 19BCS6TH03 CRYPTOGRAPHY AND NETWORK SECURITY

Time: 3 hours

(CSE)

Max. Marks: 60

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No	Questions	KL	CO	M
Unit-I				
1	a	i) Compare and Contrast block ciphers and stream ciphers		
		2	1	6M
		ii) Construct a Playfair matrix with the key 'largest'. encrypt this message: MEET ME AT THE TOGA PARTY		
		2	1	6M
OR				
	b	i) Determine the security services required to counter various types of Active and Passive attacks.		
		2	1	6M
		ii) Explain the security services in detail		
		2	1	6M
Unit-II				
2	a	i) Briefly explain the block cipher modes of operations?		
		2	2	12M
OR				
	b	i) Which four tasks are performed in each round of AES Cipher? Explain.		
		2	2	12M
Unit-III				
3	a	i) Find GCD using Euler's Theorem. Find GCD of 1070 and 1066 using Euclid algorithm		
		3	3	6M
		ii) Explain the Chinese remainder theorem with an example?		
		2	3	6M
OR				
	b	i) Using RSA algorithm, Find n, d if p=11, q=3, e=3. Encrypt "HelloWorld" Message.		
		3	3	6M
		ii) Briefly explain the Diffie Hellman Key Exchange algorithm?		
		2	3	6M
Unit-IV				
4	a	i) Give the structure of SHA-512 compression function. Explain the structure of each round.		
		2	4	12M
	OR			
	b	i) Explain the one way authentication in digital signature		
		2	4	6M
		ii) Differentiate digital signature from digital certificate.		
		3	4	6M
Unit-V				
5	a	i) Give the structure of PGP message generation. Explain with a diagram.		
		2	5	6M
		ii) Explain the X.509 authentication service		
		2	5	6M
OR				
	b	i) Explain the SET in electronic commerce		
		2	5	12M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

III B.Tech II Semester Supple. Examinations, March-2024

Sub Code: 19BCC6OE12

CLOUD COMPUTING

Time: 3 hours

(CSE&IT)

Max. Marks: 60

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No	Questions	KL	CO	M	
1	Unit-I				
	a	i) Explain the benefits of cloud computing	2	1	6M
		ii) Discuss the Evolution of Cloud Computing from Grid Computing	2	1	6M
	OR				
	b	i) Explain the characteristics of cloud computing	2	1	6M
		ii) Discuss the vendors of cloud computing	2	1	6M
2	Unit-II				
	a	Analyze the various types of virtualization mechanisms	4	2	12M
	OR				
	b	i) Explain the grid architecture with neat sketch	2	2	6M
	ii) Compare and Contrast grid computing and cloud computing	3	2	6M	
3	Unit-III				
	a	i) Discuss about SaaS in detail	2	3	6M
		ii) Explain the google app engine in PaaS	2	3	6M
	OR				
	b	i) Explain the Linthicum model in detail	2	3	6M
	ii) Explain the different types of cloud storage models	2	3	6M	
4	Unit-IV				
	a	i) Explain the processes in cloud service management	2	4	12M
	OR				
	b	i) Explain the load balancer recovery and database recovery in the disaster management	2	4	6M
	ii) How to access the cloud. Explain	2	4	6M	
5	Unit-V				
	a	i) Explain the following AWS services a) Compute Service b) Security Services c) Database Services	2	5	12M
	OR				
b	i) Comparison between Azure and AWS in detail	3	5	12M	

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

III B.Tech II Semester Supple. Examinations, March-2024

Sub Code: 19BIT6TH02 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Time: 3 hours

(IT)

Max. Marks: 60

Note: Answer All FIVE Questions. All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No	Questions	KL	CO	M			
Unit-I							
1	a	i) List and discuss any four applications of Artificial Intelligence			K3	CO1	6M
		ii) Describe a production system with water-jug problem production rules			K3	CO1	6M
	OR						
	b	i) Discuss a well defined problem in AI with an example			K3	CO1	6M
ii) Explain the issues in designing a search problem			K3	CO1	6M		
Unit-II							
2	a	Solve the CSP problem SEND + MORE= MONEY			K4	CO2	12M
		OR					
	b	i) Discuss Hill Climbing algorithm in detail with an example			K3	CO2	6M
		ii) Apply A* algorithm to the following example , where the costs given below each node are heuristic costs			K4	CO2	6M
Unit-III							
3	a	i) Convert the following sentences into predicate logic form (a) Marcus was a man. (b) Marcus was a Roman. (c) All men are people. (d) Caesar was a ruler. (e) All Romans were either loyal to Caesar or hated him (or both). (f) Everyone is loyal to someone			K4	CO3	6M
		ii) Compare Forward reasoning versus Backward reasoning			K3	CO3	6M
	OR						
	b	i) Discuss semantic nets with an example			K3	CO3	6M
ii) Compare Procedural knowledge versus Declarative Knowledge			K3	CO3	6M		
Unit-IV							
4	a	i) Illustrate the steps of designing a Learning System in machine learning			K3	CO4	6M
		ii) Discuss Perspective and Issues in Machine Learning			K3	CO4	6M
	OR						
	b	i) Demonstrate well-posed learning problem with an example			K3	CO4	6M
ii) Discuss the applications of machine learning in detail			K3	CO4	6M		
Unit-V							
5	a	i) Demonstrate ID3 decision tree algorithm			K3	CO4	6M
		ii) Explain the issues in decision tree learning			K3	CO4	6M
	OR						
	b	i) Discuss the capabilities and limitations of decision tree learning			K3	CO4	6M
ii) Explain the measures used in constructing a decision tree with an example			K4	CO4	6M		

III B.Tech II Semester Supple. Examinations, March-2024

Sub Code: 19BCC60E13

BLOCK CHAIN TECHNOLOGIES

Time: 3 hours

(IT)

Max. Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No	Questions	KL	CO	M	
1	Unit-I				
	a	i) Discuss the prominence role of block chain technology and explain its characteristics.	K3	CO1	6M
		ii) How is block chain revolutionizing the traditional business network? Explain it with an example?	K3	CO1	6M
	OR				
	b	i) Discuss The shortcomings of current transaction systems?	K3	CO1	6M
		ii) Explain The emergence of bitcoin?	K3	CO1	6M
2	Unit-II				
	a	i) Discuss the role of block chain technology in smart contracts and explain its applications.	K3	CO2	6M
		ii) Demonstrate the working procedure of block chain technology with suitable diagram.	K2	CO2	6M
	OR				
	b	i) Discuss the role of distinct participants in block chain network.	K3	CO2	6M
		ii) Write a short note on shared ledger and its uses.	K2	CO2	6M
3	Unit-III				
	a	i) How to reduce the information friction in business industry. Explain it.	K3	CO3	6M
		ii) How to drive the business with block chain technology, explain it with suitable example.	K3	CO3	6M
	OR				
	b	i) Write a short note on how to transform ecosystems through increased visibility.	K3	CO3	6M
		ii) Write a short note on Interaction and Innovation frictions with suitable examples.	K2	CO3	6M
4	Unit-IV				
	a	i) Explain the role of block chain technology in health care industry with suitable example.	K3	CO4	6M
		ii) Write a short note on supply chain management and cross border transactions.	K2	CO4	6M
	OR				
	b	i) Discuss the necessity of block chain technology in government sector with suitable real time example.	K3	CO4	6M
		ii) Define use case and write any four use cases for financial services.	K2	CO4	6M

Unit-V					
5	a	i) Write a short note on hyper ledger vision and mention its merits.	K5	CO5	6M
		ii) How to recognize and launch block chain technology for rapid growth in any business industry.	K3	CO5	6M
	OR				
	b	i) Demonstrate the innovative strategic approach of IBM with block chain technology.	K5	CO5	6M
ii) Discuss the role of hyper ledger fabric and mention its merits.		K3	CO5	6M	

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks
