

**FACULTY OF ENGINEERING****B.E. (Civil) VI – Semester (CBCS) (Main) Examination, May / June 2019****Subject: Transportation Engineering – II****Time: 3 Hours****Max.Marks: 70****Note: Answer all questions form Part-A and any five questions from Part-B.****Missing data if any may suitably be assumed.****PART – A (10x2 = 20 Marks)**

- 1 What are the different gauges used in Indian Railways?
- 2 What are the various types of sleepers used in the construction of the railway track? Mention merits and demerits of any two types.
- 3 Define gradient and what are the various types of gradients used in the construction of the railway track.
- 4 If a wheel base of a vehicle moving on a B.G. track is 6m, the wheel diameter is 1.5m and the depth of flanges below the top of the rail is 3.17 cm. Determine the extra width to be provided on gauge, if the radius of the curve is 160m.
- 5 Explain the necessity of maintaining the railway track.
- 6 Why is it necessary to provide adequate drainage facilities for a railway track?
- 7 What are the characteristics of the aircraft that are to be given importance for Airport planning and design?
- 8 Discuss the advantages and disadvantages of transport with other modes of transport.
- 9 What are the corrections needed for basic runway length?
- 10 What is wind rose diagram?

**PART – B (5x10 = 50 Marks)**

- 11 a) What is Railway alignment? What are the factors to be considered for good alignment? 3  
b) Briefly explain the surveys to be conducted for railway alignment. 7
- 12 a) What is super elevation? Derive an equation to show the relationship of super elevation (e), with gauge (G), Speed (v) and radius of the curve (R). Also mention the maximum permissible super elevation values in India for different gauges. 5  
b) On a B.G. 3° curve the equilibrium cant is provided for a speed of 70 km/hr. Calculate the value of equilibrium cant. Allowing a maximum cant deficiency, what would be the maximum permissible speed on the track? 5
- 13 Briefly explain the stages of construction of a new railway track. 10
- 14 a) What are the characteristics of an ideal airport layout. 3  
b) What are the different systems of aircraft parking? 7
- 15 a) Explain the various factors that are to be considered while selecting a suitable site for an airport. 5  
b) The length of the runway under standard conditions is 1620m. The airport site has an elevation of 270m above mean sea level. Its airport reference temperature is 32.9°C. If the runway is to be constructed with a effective gradient of 0.2%. Determine the corrected length of the runway. 5
- 16 a) What are points and crossings. Explain the necessity of points and crossings. 5  
b) What is a turnout? Draw a layout of a right hand turnout and explain in detail. 5
- 17 Write short notes on any four of the following: 10
  - a) Coning of Wheels
  - b) Grade compensation on curves
  - c) Role of ICAO
  - d) Maintenance of gauge
  - e) Creep in rails and its causes

## FACULTY OF ENGINEERING

B.E. 3/4(Civil) II – Semester (Backlog) Examination, May / June 2019

Subject: Steel Structures

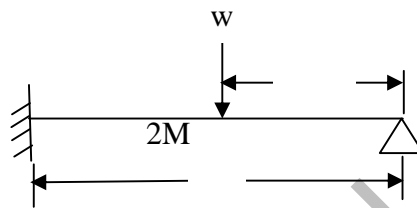
Time: 3 Hours

Max. Marks:75

Note: Answer all questions from Part A & any five questions from Part B.

### PART – A (10 x 2.5 = 25 Marks)

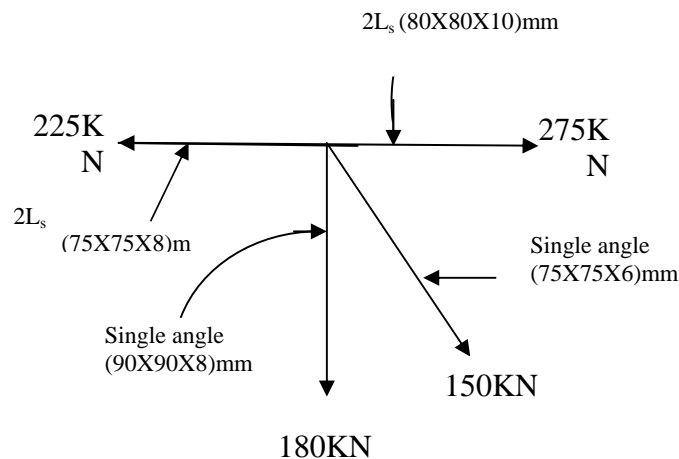
1. Write difference between working stress & limit state methods.
2. What are different of type's failures in bolts and plates also draw figs.
3. Calculate collapse load condition shown in the fig. given below.



4. Explain neatly block shear failure conditions for bolted section.
5. Explain different types of failures in tension members.
6. What are the different types of buckling & write one function of it (Resistance).
7. Write Euler's stress formula & merchant-Rankin formulae with details.
8. What is residual stress in compression member & write formula for stress reduction factor.
9. Write about lateral stability of beams & lateral torsional bulking of beam.
10. Explain difference between laterally supported & laterally un-supported beams.

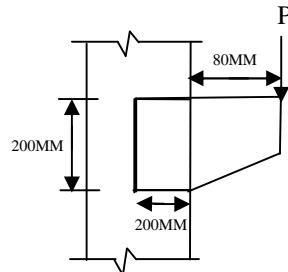
### PART – B (5 x 10 = 50 Marks)

11. Design joint "B" of a roof truss as shown in fig. the members are connected with 18MM diameter bolts of 4.8 grade to the gusset plate 12MM thick & Draw neat sketch.

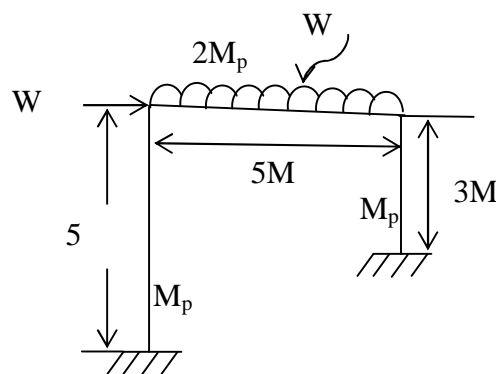


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12. A bracket plate is used to transfer the reaction of a beam to a column flange as shown in fig. the bracket plate is connected to the column flange by a 6mm fillet weld compute the maximum load that can be placed over the bracket plates at a distance of 80mm from the flange of the column section. 10



13. Design a bridge truss diagonal subjected to a factored tensile load of 300KN, the length of the diagonal is 3m. The tension member is connected to a gusset plate 16mm thick with one line of 20mm diameter bolts of grade 8.4 10
14. Design a built-up-column 9m long to carry a factored axial compressive load 1200KN. The column is restrained in position but in direction at both the ends. Design the column with connecting by system as battens with bolted connections. use two channel sections back to back use steel of grade Fe-410 10
15. Design the laterally unsupported beam for effective length of span 5m, maximum bending moment 550N-M, maximum shear force 250KN use steel of grade Fe-410. 10
16. A column [ISHB-400@681.3N/M](#) carries an axial compressive factored load of 2000KN. Design a suitable bolted gusset base. The base rests on M-15 Grade concrete pedestrian. Use grade 4.6 & 24mm diameter bolts making connections. 10
17. Find out collapse load for the given portal frame. 10



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**FACULTY OF ENGINEERING****B.E. 3/4 (EEE) II - Semester (Backlog) Examination, May / June 2019****Subject : Electrical Machinery - III****Time : 3 Hours****Max. Marks: 75****Note: Answer all questions from Part-A & any five questions from Part-B.****PART – A (25 Marks)**

- 1 What “slip” is conducted on a salient pole synchronous machine? (2)
- 2 Why is short pitch winding preferred over full-pitch winding? (3)
- 3 What is the necessity for predetermination of voltage Regulation? (2)
- 4 What steps are to be taken before disconnecting one Alternator from parallel operation? (3)
- 5 Explain, how a synchronous motor differ from synchronous condenser. (3)
- 6 Why damper winding is provided in polyphase synchronous motor? (3)
- 7 What is mean by Infinite Bus? (2)
- 8 Write the applications of stepper motors. (2)
- 9 Draw the characteristics of two phase servo motors. (2)
- 10 Write the differences between compensated and uncompensated AC series motors. (3)

**PART – B (50 Marks)**

- 11 (a) Describe the various schemes used for exciting large synchronous machines. Which scheme is being preferred these days for exciting very large turbo-generators and why? (5)
- (b) The armature of an 8-pole, 3-phase, 50 Hz alternator has 18 slots and 10 conductors / slot. A flux of 0.04 wb is entering the armature from one pole. Calculate the induced emf. per phase. (5)
- 12 (a) Explain the two reactions theory as applied to salient pole synchronous machines and draw its phasor diagram for a lagging power factor load. (5)
- (b) A 3-phase, star connected alternator is rated at 1500 KVA, 11 KV. The resistance and reactance per phase are  $1.5 \Omega$  and  $30 \Omega$  respectively. To what value will the terminal voltage rise when full-load at p.f. 0.8 lagging is switched off. (5)
- 13 (a) Derive an expression for power developed in a cylindrical rotor synchronous generator in terms of power angle and synchronous impedance. (5)
- (b) An alternator with a synchronous impedance of  $(0+j 1.25)$  p.u. delivers rated current to infinite bus base at p.f. 0.8 lagging. For the same excitation, find the current and power factor just before falling out of step. (5)
- 14 (a) Describe with physical concepts, the Hunting phenomenon in synchronous machines and how it can be prevented. (5)
- (b) Describe with the help of phasor diagram the effect of varying the excitation of synchronous motor at constant mechanical load. (5)

..2..

- 15 (a) Explain how steady-state stability limit can be depicted on the power circle diagrams. (5)  
(b) Explain the principle and operation of Hysteresis motors and give their applications. (5)
- 16 (a) Discuss the principle, operation and applications of Linear Induction motors. (4)  
(b) Mention various types of 1-phase split-phase induction motors and discuss any one of them. (6)
- 17 (a) Discuss in detail the working principle and characteristics of Two-phase servo motor. (4)  
(b) Explain how the synchronous impedance affects the value of the load angle for maximum power delivered when the machine acts as motor. (6)

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**FACULTY OF ENGINEERING****B.E 3/4 (Inst.) II Semester (Backlog) Examination, May/June 2019****Subject: Process Control****Time: 3 Hours****Max. Marks: 75****Note: Answer all questions from Part-A & Any five questions from Part-B.****PART – A (25 Marks)**

1. Define the system function? [2]
2. With a neat Block Diagram, Explain the process control loop. [3]
3. Define Proportional band? [2]
4. In a certain integral controller, the error changes Sinusoidally with time. Show that phase of the controller output lags  $90^\circ$  behind the error. [3]
5. What is an offset? [2]
6. Compare the effects of PI, PD, PID actions on time constant Process. [3]
7. What is tuning of Controller? [2]
8. Explain the function of Pneumatic valve positioned. [3]
9. With a neat circuit diagram explain the relay controller. [3]
10. Draw the ladder diagram for NAND Gate. [2]

**PART – B (50 Marks)**

11. a) With a schematic diagram explain the flow control system indicating all the elements of the Process control loop. [5]  
b) Explain the dead time Process with all its necessary mathematical approximations [5]
12. Explain the P+I+D controller operation. write all the relevant equations and graphical interpretation and also obtain its electronic implementation. [10]
13. a) Explain the two position controller. [5]  
b) With a schematic diagram explain the pneumatic P+D controller. [5]
14. a) Explain the control valve Characteristics. [5]  
b) Explain the working principle of hydraulic Actuator. [5]
15. a) Explain the Ziegler Nichols method for controller tuning. [6]  
b) In an application of the Ziegler-Nichols method, a process begins oscillations with 30% proportional band in an 11.5-min period. Find the standard settings for PID Control. [4]
16. a) Explain the ladder diagram with an example. [5]  
b) Explain the programmable logic controller with a basic block diagram. [5]
17. Write short notes on
  - a. Process degree of freedom [4]
  - b. Solenoid valve [3]
  - c. PLC operation [3]

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**FACULTY OF ENGINEERING**  
**BE 3/4 (ECE) II – Semester (Backlog) Examination, May/June 2019**

**Subject: Digital Signal Processing**

Time: 3 hrs

Max. Marks: 75

**Note: Answer All Questions from PART-A & any five from Part-B.**

**PART – A (25 Marks)**

1. State symmetry and conjugate properties of DFT. (2)
2. How many Multiplications and additions are involved in direct computation of DFT and FFT, Compare? (3)
3. What is pre-warping? Give the relation between analog and digital frequencies in Bilinear transformation technique? (3)
4. Compare Butterworth and chebyshev filter design approximation techniques. (2)
5. List the characteristics of FIR filters designed using windows. (2)
6. Compare and comment the on characteristics of various window techniques. (3)
7. Discuss the computationally efficient implementation of Interpolator in an FIR filter. (3)
8. What is anti-aliasing and anti-imaging filters and where are they used? (3)
9. How fast data access is achieved in Digital signal processors? (2)
10. How much of On-chip memory is available for TMS320C54X processor? (2)

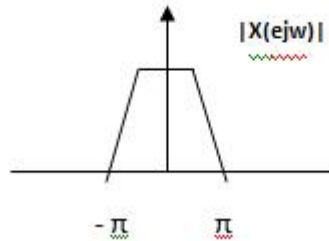
**PART – B (50 Marks)**

11. a) Perform Linear convolution of the following sequences by Overlap –Save method  
 $h(n)=\{1,0,3\}$ ;  $x(n)=\{3,-1,2,-4,5,7\}$ . (5)
- b) Perform circular convolution of the two sequences using concentric circles method  
 $X_1(n)=\{1,2,-1,1\}$ ;  $x_2(n)=\{2,-2,-1,2\}$  (5)
12. a) Compute IDFT of the sequence  $X(K)=\{2,1-j,0,1+j\}$  (5)
- b) Compute 8-point DFT of the discrete time signal  $x(n)=\{1,2,1,2,1,3,1,3\}$  using DIF- FFT algorithm. (5)
13. Design a Low-pass filter for the following specifications for  $N=5$ , Lower cut-off Frequency = 0.4 rad/sample, using hanning window. Realize the filter structure. (10)
14. Design a Butterworth digital IIR low pass filter using Bilinear transformation technique by taking  $T=0.6$  sec, to satisfy the following specifications. Draw direct-form II structure.(10)
 

0.6	$ H(e^{j\omega}) $	1.0,	for	$0 \leq \omega \leq 0.3$
	$ H(e^{j\omega}) $	0.02,		$0.575 \leq \omega \leq \pi$

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15. a) Discuss the sampling rate conversion by a rational factor  $I/D$ . (5)
- b) Draw the spectrum of the down sampled signal for the sampling rate factor  $I = 2$  and  $I = 3$ . (5)



16. a) Discuss the various addressing modes of TMS320C54X processor with examples. (10)
- b) Write short notes on various on-chip peripherals of TMS320C5x
17. Write any two (10)
- a) Obtain  $H(Z)$  from  $H(s) = 3s/(s^2 + 0.5s + 2)$  using Bi-linear transformation technique when  $T = 1$  sec.
- b) Write short notes on Finite word length effects.
- c) Sub-band coding of Speech signals.

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**FACULTY OF ENGINEERING****B.E. 3/4 (Mech.) II - Semester (Backlog) Examination, May / June 2019****Subject : Metal Cutting and Machine Tool Engineering****Time : 3 hours****Max. Marks : 75****Note: Answer all questions from Part-A. Answer any Five questions from Part-B.****PART – A (25 Marks)**

1 Match the following

A	Al	i	Kerosene
B	Grade steel	ii	Sry
C	Mg	iii	Lower speed
D	Stainless steel	iv	Water noble fluid

- 2 Sketch crater wear in single point cutting tool.
- 3 Why is economics of machining is to be considered?
- 4 State suitable cutting tool materials for Cast Iron, Al, MS.
- 5 State the operations conducted in lathe operations.
- 6 When and why a reamer is used.
- 7 Sketch internal thread rolling process.
- 8 State characteristics of super finishing.
- 9 State four reasons as to why Jigs and fixtures are required in machine tool operations.
- 10 State four reasons as to why unconventional methods route is used for machining of materials.

**PART – B (50 Marks)**

- 11 a) Characteristics of cutting tool toughness from HSS to diamond.  
b) Sketch tool geometry nomenclature according to NRS system.
- 12 a) Sketch experimental set up for tool-work temperature measuring using thermocouple method.  
b) Explain the machinability evaluation with respect to surface finish criteria.
- 13 a) Sketch 8 possible planning operations using planing machine.  
b) State all the work holding devices in milling machines.
- 14 a) Sketch nine different planing operations.  
b) Explain the factors in consideration for selecting of grinding wheel.
- 15 a) Explain the principles of clamping.  
b) Explain the process variables affecting ECM product geometry.
- 16 a) State the ten special features of Jig boring machine.  
b) Sketch the Tap nomenclature with its elements.
- 17 a) Sketch and explain the internal and external cylindrical surfaces of lapping.  
b) Sketch Gear cutting by formed share single point end mill.

**FACULTY OF ENGINEERING**

**B.E. 3/4 (Prod.) II – Semester (Backlog) Examination, May 2019**

**Subject: Metal Casting & Welding**

**Time: 3 Hours**

**Max. Marks: 75**

**Note: Answer all questions from Part A and any five questions from Part B**

**PART – A (10 x 2.5 = 25 Marks)**

1. For what reasons molds are vented.
2. How hot tears are avoided in Die casting process?
3. State the types of electrodes used in welding.
4. What are welding metallurgy parameters of study in metals?
5. State the general properties for causing defects in weld joints.
6. Sketch the welding techniques-leftward and rightward.
7. State the testing methods conducted on a casting.
8. State the use of Chvorinov's rule in design of risers.
9. List out the advantages of continuous casting.
10. State Principle of induction brazing.

**PART – B (5 x 10 = 50 Marks)**

11. a) Draw a neat sketch of sand casting and explain it's working..  
b) What design factors should the engineer observe when specifying a casting?
12. a) Explain shell moulding process with neat sketch.  
b) With help of neat sketch, explain CO<sub>2</sub> process of casting.
13. a) Explain the process of centrifugal casting.  
b) Explain investment casting with neat sketch.
14. a) Explain the Plasma Arc welding equipment.  
b) Explain the criteria for selection of electrode in Arc welding.
15. a) Explain electric resistance spot welding process with neat sketch.  
b) Explain the characteristics of AL and AI alloys in welding.
16. a) Explain the cold cracks formation with neat sketch.  
b) Explain one method of manufacturing Composite materials.
17. a) Explain the welding defects of AI castings.  
b) Explain the ultrasonic process welding process parameters.

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**FACULTY OF ENGINEERING**

**B.E. 3/4 (A.E.) II – Semester (Backlog) Examination, May 2019**

**Subject: Performance of Testing of Automotive Vehicles**

**Time: 3 Hours**

**Max. Marks: 75**

**Note: Answer all questions from Part A and any five questions from Part B**

**PART – A (10 x 2.5 = 25 Marks)**

1. What are the factors affecting the value of  $C_d$ ?
2. Explain briefly traction resistance.
3. List the various types of gearbox's used in Automobiles.
4. Write the classification of clutches.
5. Explain the importance of vehicle safety.
6. Write some effects on fuel economy by tyre and road condition?
7. Draw a neat sketch of anti-roll bar.
8. Give the main troubles of brakes and their causes.
9. Explain how the clutch is to be tested.
10. Explain how the brakes are to be tested.

**PART – B (5 x 10 = 50 Marks)**

11. a) What is the difference between the traction and tractive effort?  
b) How to determine centre of gravity (CG) of a vehicle.
12. a) Describe the construction and working of sliding mesh gear box.  
b) How will you find the total gear ratio from engine to rear wheels for the above?
13. a) Explain briefly any 3 types of engine ratings.  
b) Explain ideal air standard efficiency and relative efficiency.
14. Explain with neat sketch the mechanics of a hydraulic braking system and find the total output force for all four wheels for the given below.  
Force on front pedal = 75N  
Master cylinder stroke be 1 cm and area = 4 cm<sup>2</sup>  
Front piston area = 18 cm<sup>2</sup>  
Rear piston area = 4.5 cm<sup>2</sup>
15. a) A rack and pinion steering gear has a 5 tooth pinion of 10 mm pitch if an effort of 15N is applied by each hand on the 350 mm diameter steering wheel determine  
(i) the moment ratio  
(ii) the force transmitted to the tie rods.
16. Explain briefly vehicle testing on chassis dynamometer..
17. Explain the following:  
(a) Road and track testing  
(b) Emission test  
(c) Engine compression test.

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## FACULTY OF ENGINEERING

BE 3/4 (CSE) II – Semester (Backlog) Examinations, May / June 2019

Subject: Design & Analysis of Algorithms

Time: 3 Hours

Max. Marks: 75

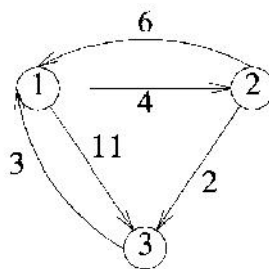
**Note: Answer all questions from Part – A & any five questions from Part – B**

### PART – A (25 Marks)

1. What is hashing? List 5 popular Hashing Functions? (2M)
2. Briefly Explain Performance Measurement of an algorithm. (3M)
3. Write a Greedy Knapsack Algorithm? (3M)
4. Write the control abstraction for Divide and Conquer technique? (2M)
5. Explain the 0/1 Knapsack problem (2M)
6. Explain Reliability Design problem (3M)
7. Explain P and NP Classes (2M)
8. Differentiate Backtracking with branch and bound. (3M)
9. What is meant by Halting Problem? (2M)
10. What is Hamiltonian cycle? How is it different from the tour of traveling sales person problem? (3M)

### PART – B (5x10=50 Marks)

11. a) Write and Explain Asymptotic Notations? (3M)  
 b) Sort the following numbers 3, 16, 12, 14, 11, 15 using Heap sort. Show the step by step procedure.? (7M)
12. a) Present an Algorithm “select” that finds the  $k^{\text{th}}$  smallest element in an array  $a[1: n]$ . (5M)  
 b) Write a recursive algorithm for finding both the minimum and maximum Elements in an array A of n elements. (5M)
13. Apply Floyed’s Warshall Algorithm to find the All-Pairs shortest paths for the given graph. (10M)



14. a) Explain Lower Bound Theory. (3M)  
 b) Write an algorithm for n Queens using backtracking approach. (7M)
15. Briefly explain any three NP-Hard graph problems. (10M)

Contd...2

16. a) Consider the following instance of knapsack problem  $n = 7$ ,  $m = 15$   
(P1, P2, P3, P4, P5, P6, P7) = (10, 5, 15, 7, 6, 18, 3) and  
(W1, W2, W3, W4, W5, W6, W7) = (2, 3, 5, 7, 1, 4, 1) solve by using Greedy  
approach. (5M)
- b) Give the algorithm for matrix multiplication and find the time complexity of  
the algorithm using step – count method? (5M)
17. Write Short notes on the following
- a) Branch and Bound strategy (5M)
- b) Traveling salesman problem using dynamic programming (5M)

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**FACULTY OF ENGINEERING**  
**BE 3/4 (I.T) II Semester (Backlog) Examination, May/June 2019**

**Subject: Data ware Housing and Data Mining**

**Time: 3 Hours**

**Max. Marks: 75**

**Note: Answer all questions from Part – A, & any Five questions from Part – B.**

**PART – A (25 Marks)**

1. List the various stages of a KDD process. 3M
2. Why do we preprocess the data? Give any two reasons. 2M
3. List the differences between OLAP & OLTP. 3M
4. What is a Data Mart? 2M
5. What are the various kinds of association rules? Give examples. 3M
6. Define Support and Confidence. 2M
7. What is a decision tree? 2M
8. Define classifier accuracy measures. 3M
9. Differentiate Agglomerative and Divisive clustering. 2M
10. Define inter-quartile range and five-number summary. 3M

**PART – B (50 Marks)**

11. (a) Draw the architecture of a typical data mining system and explain the role of each component in it. 5M  
 (b) Write about various data mining functionalities. 5M
12. (a) Explain various types of multidimensional data model with examples. 5M  
 (b) Write about various types of OLAP operations. 5M
13. (a) Explain different method for improving the efficiency of Apriori Algorithm. 4M  
 (b) A database has six transactions. Let min-sup = 50% and min-conf = 75%. Find all frequent item sets using Apriori algorithm. List all the strong association rules. 6M

TID	List of items
1	Pencil, sharpener, eraser, color papers
2	Color papers, charts, glue sticks
3	Pencil, glue stick, eraser, pen
4	Oil pastels, poster colours, correction tape
5	Whitener, pen, pencil, charts, glue stick
6	Colour pencils, crayons, eraser, pen

14. Explain How Decision Trees can be used for classification using various types of attribute selection measure. 10M
15. (a) Discuss the types of data in cluster analysis. 5M  
 (b) Explain statistical based outlier detection and density based outlier detection. 5M

Contd..2

16.  $K=3$  and initial points are assigned to clusters as  $C1=\{A1,A2,A3\}$ ,  $C2=\{A4,A5,A6\}$ ,  $C3=\{A7,A8\}$ . Explain the formation of clusters with K-means algorithm. 10M

	X	Y
A <sub>1</sub>	2	10
A <sub>2</sub>	2	5
A <sub>3</sub>	8	4
A <sub>4</sub>	5	8
A <sub>5</sub>	7	5
A <sub>6</sub>	6	4
A <sub>7</sub>	1	2
A <sub>8</sub>	4	9

17. Write short notes on:
- (a) Concept hierarchies. 4M
  - (b) Decision tree pruning. 3M
  - (c) Trends in Data Mining. 3M

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