

FACULTY OF ENGINEERING

B.E. III/IV (Civil) II – Semester (Main & Backlog) Examination, May/June 2018

Subject: Theory of Structure - II

Time: 3 Hours

Max. Marks: 75

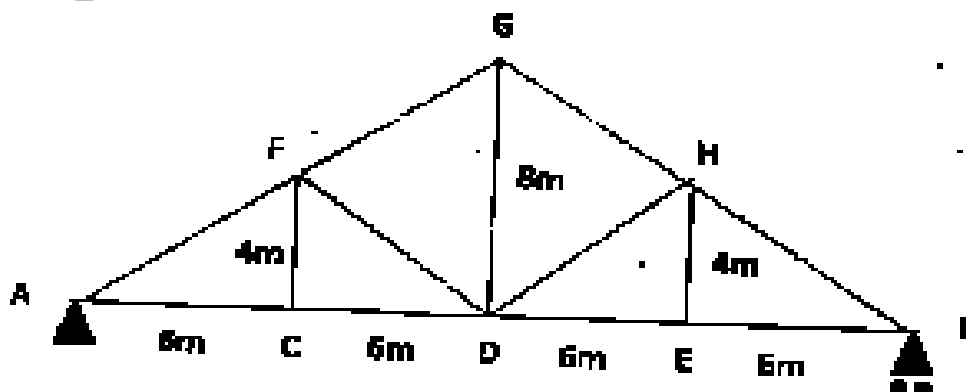
Note: Answer all questions from Part A & any FIVE questions from Part – B.

PART – A (25 Marks)

- 1) Define influence line diagram and focal length 3M
- 2) Draw influence line for any bottom chord member of pratt truss with 6 panels 3M
- 3) A suspension cable of horizontal span 40 m, central dip 4m is subjected to a load of 10kN/M over the entire span. Find the maximum tension in the cable. 3M
- 4) State any three properties of a flexibility matrix. 3M
- 5) Write the conditions for absolute maximum BM at a section when several concentrated loads are traversing a simply supported girder. 3M
- 6) What is the difference between flexibility and stiffness matrix 2M
- 7) Distinguish between Force and displacement method of structural analysis 2M
- 8) Develop stiffness matrix for 2D truss element. 2M
- 9) What is counter bracing and when do you provide it. 2M
- 10) List any two assumptions or limitations of structural analysis software STAAD PRO. 2M

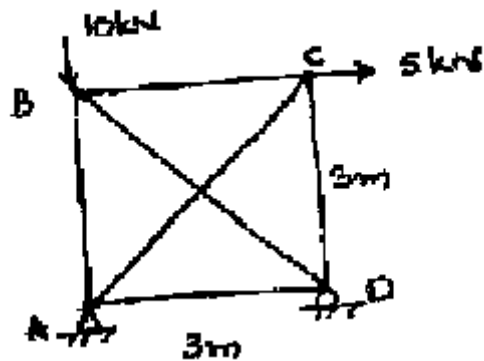
PART – B (Marks 50)

- 11 A uniform load of 2kN/m, 4 m long, crosses a girder of 16 m span. Calculate the maximum SF and BM at 6m and 8m from the left hand support. Also, draw maximum BM and SF diagrams. 10M
- 12 Draw the influence lines for axial forces in members CF, FG and DG for the truss shown in figure. Unit load moving along AB.

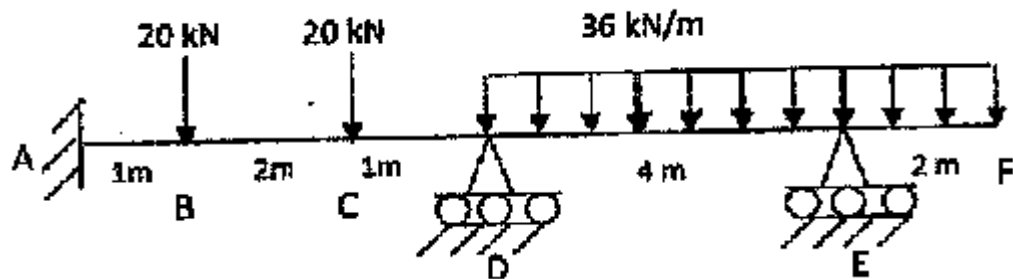


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- 13 Analyze the truss shown in fig. using stiffness matrix method. Assume AE as constant.



- 14 Analyze the beam shown in figure by Flexibility matrix method and draw BMD. EI is constant.



- 15 A system of 5 concentrated loads 100kN, 100kN, 200 kN, 200kN and 160 kN separated by distance of 3m, 4m, 4.5m and 3m respectively are traversing a simply supported girder from right to left with 100 kN load as leading load. Determine the maximum SF and BM at the quarter span.
- 16 A symmetrical suspension bridge has two cable of 200m span and central dip of 20m. It carries a total load of 500 kN which is uniformly distributed over the entire span of the cable. Calculate the horizontal component of tension and maximum tension in each cable.
- 17 Write short notes on the following:
- Enveloping Parabola
 - Direct Element Method
 - Equivalent Uniformly Distributed Load (E.U.D.L)

FACULTY OF ENGINEERING**B.E. 3/4 (EEE) II-Semester (Main & Backlog) Examination, May / June 2018****Subject: Switch Gear and Protection****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 | What is universal relay torque equation? | 2 |
| 2 | Classification of different types of protective relays. | 3 |
| 3 | Define distance relays and explain R-X diagram. | 2 |
| 4 | Explain the principle of duality in comparators. | 3 |
| 5 | What is differential protection and explain why biased differential relay is preferred over a simple differential relay? | 3 |
| 6 | What are the causes for rotor over heating and how it is protected? | 2 |
| 7 | Explain why asymmetrical breaking current is higher than symmetrical breaking current in circuit breaker. | 3 |
| 8 | What are the advantages of minimum oil circuit breaker? | 2 |
| 9 | What are the causes of over voltage and mention their remedial measures? | 3 |
| 10 | What are the methods to reduce the tower footing resistance? | 2 |

PART – B (50 Marks)

- | | | |
|-------|---|----|
| 11 a) | An IDMT relay operates in 6 seconds and 3 seconds for PSM's value 4.5 and 10 respectively. The relay is used to protect a feeder through a 1000/5 Amps CT calculate the time of operation of the relay when the feeder current is 1500 A. The relay plug setting of 75% and time setting 0.4. The normal current rating of the relay is 5A. | 5 |
| b) | Draw and explain the construction and working of an induction relay with neat diagram also explain how current setting and time setting is obtained. | 5 |
| 12 | What is an impedance relay? Discuss in detail how it is realized using the
i) phase comparator ii) Amplitude comparator iii) Electromagnetic principle. | 10 |
| 13 a) | Discuss briefly about generator transformer unit protection. | 5 |
| b) | Describe the balanced (opposed) voltage differential protection scheme. | 5 |
| 14 a) | In a 132kV system, the inductance and capacitance upto the 10 cation if the circuit breaker are 0.4H and $0.015 \times 10^{-6}F$, respectively. Determine
i) The maximum value of restriking voltage across the contacts of the circuit breaker
ii) Frequency of transient oscillation and
iii) The maximum value of RRRV | 6 |
| b) | Explain the phenomenon of current chopping in a circuit breaker. What are the remedial measures to decrease the effect of current chopping. | 4 |

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- 15 a) Explain in detail the construction and working principle of multi gap type of lighting arrestor. 6
b) Discuss in detail characteristics of surge diverter with neat diagram. 4
- 16 a) What is meant by 3 zone protection? Explain. 4
b) With neat diagram explain phase fault and earth fault protection. 6
- 17 Write short notes on the following :
a) Resistance switching 5
b) Surge Absorber 5

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FACULTY OF ENGINEERING**B.E. 3/4 (Inst.) II-Semester (Main & Backlog) Examination, May / June 2018****Subject : Power Plant Instrumentation****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 | What is meant by draught in TPP? | 3 |
| 2 | Draw the P & I diagram of excess air control. | 3 |
| 3 | Explain the basic principle involved in Nuclear power plant. | 3 |
| 4 | What are non-conventional energy sources? | 3 |
| 5 | Draw the block diagram of TSI. | 3 |
| 6 | What are the different types of glands used in steam exhaust control? | 2 |
| 7 | What is meant by feed water conditioning? | 2 |
| 8 | How many types of condensate systems are present in TPP? | 2 |
| 9 | What is the basic difference between three element and two element drum level control? | 2 |
| 10 | What is meant by "Attemperation"? | 2 |

PART – B (50 Marks)

- | | | |
|----|--|-------------|
| 11 | a) With a neat diagram explain the boiler following mode.
b) Write briefly about fan drives and control in TPPP. | 7
3 |
| 12 | With a neat diagram explain hydrogen generator cooling system. | 10 |
| 13 | With a neat diagram explain the power generation in Nuclear Power Plant (NPP) and explain the importance of control rods in NPP. | 10 |
| 14 | a) With a neat diagram explain smoke and dust monitoring.
b) Discuss about Flame monitoring. | 6
4 |
| 15 | With a neat diagram explain power generation using thermal power plant. | 10 |
| 16 | Explain with a process diagram the fuel-air ratio control and discuss about O ₂ trimming methods. | 10 |
| 17 | Write short notes on :
a) Steam circuits
b) Condenser vacuum control
c) Principle of Hydro electric power generation | 3
3
4 |

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) II – Semester (Main & Backlog) Examination, May / June 2018

Subject: Antennas and Wave Propagation

Time: 3 Hours

Max. Marks: 75

**Note: (i) Answer All Questions From Part-A & Any five Questions From Part-B.
(ii) Missing data, if any may suitably be assumed.**

PART–A (25 Marks)

- | | |
|--|---|
| 1. Define a uniform linear array | 2 |
| 2. Distinguish between directive gain and power gain of an antenna | 3 |
| 3. A radio link has a 15W transmitter connected to an antenna of 2.5 m^2 effective aperture at 5 GHz. The receiving antenna has an effective aperture of 0.5 m^2 and is located at 15 km from the transmitting antenna. Obtain the power delivered to the receiver assuming lossless, matched antennas | 3 |
| 4. Define line of sight (LOS) propagation | 2 |
| 5. What is the skip zone of a radio wave? | 2 |
| 6. Compare the loop antenna with short dipole | 3 |
| 7. What is principle of pattern multiplication? Explain | 2 |
| 8. Mention the advantages and disadvantages of a rhombic antenna | 3 |
| 9. Calculate the distance at which an electromagnetic wave will have the same magnitude for induction and radiation fields if its frequency is 10MHz | 3 |
| 10. Define retarded potential of an antenna | 2 |

Part-B (50 Marks)

- | | |
|---|----|
| 1. a) Explain the following terms with respect to antenna. (i) HPBW (ii) directivity (iii) radiation intensity (iv) antenna efficiency and (v) radiation resistance | 5 |
| b) A half – wave dipole is made of copper ($\sigma = 5.7 \times 10^7 \text{ s/m}$) Wire. Determine radiating efficiency at 100MHz if radius of wire 3×10^{-4} , $R_r = 73\Omega$ for half wave dipole. | 5 |
| 12 Starting from the fundamentals derive the radiation resistance of a half wave dipole | 10 |
| 13. Discuss about constructional feature, dimensional considerations, beam width, directivity and applications of horn antenna. | 10 |
| 14. a) Synthesize an array having two isotropic point sources of same amplitude but in phase quadrature separated by a distance of $\lambda/2$ placed symmetric with respect to origin. Draw the radiation pattern. | 6 |
| b) Write a note on binomial arrays. | 4 |
| 15 a) Give the structure of ionosphere and explain the mechanism of skywave propagation | 7 |
| b) Calculate the radio horizon for a 100m transmitting antenna and a receiving antenna of 25 mts. | 3 |
| 16 a) By deriving Friis's transmission formula, determine the maximum effective area of a hertzian dipole of length 10cm operating at 100 MHz. if the antenna receives $3/4 \text{ W}$ of power, obtain the power density of the incident wave. | 7 |
| b) obtain the distance at which the induction and radiation fields are equal | 3 |
| 17. Write explanatory notes on | |
| a) Parabolic reflectors | 5 |
| b) Surface waves | 5 |

FACULTY OF ENGINEERING

B.E. 3/4 (Prod) II – Semester (Main & Backlog) Examination, May / June 2018

Subject: TURBO MACHINERY

Time: 3 Hours

Max. Marks: 75

Note: Answer all Questions from Part-A, & any Five Questions from Part-B.

PART – A (25 Marks)

1. Differentiate between impulse and reaction turbines.
2. What is the force exerted by the jet on a stationary curved plate when the jet strikes at the centre?
3. Define priming in centrifugal pumps.
4. Classify compressors
5. What is a draft tube what are its functions?
6. What is cavitation in turbines what are its effects?
7. What is critical pressure ratio through nozzles?
8. What are the methods of improving efficiency of steam turbine?
9. Differentiate between open and closed cycle gas turbine.
10. What is inter cooling in gas turbines?.

PART-B (50 Marks)

11. A jet of water moving at 12m/s impinges on vane shaped to deflect the jet through 120° when stationary if the vane is moving at 5m/s. Find the angle of the jet so that there is no shock at inlet What is the absolute velocity of the jet at exit in magnitude and direction and the work done per second per unit weight of water striking per second, assume that the vane is smooth.
12. (a) Derive an expression for the for minimum speed for starting a centrifugal pump.
 (b) An axial flow compressor having eight stages and 50% reaction design compresses air in the pressure ratio 4:1 the air enters the compressor at 20°C and flows through it with a constant speed of 90m/s. the rotating blades of compressor rotate with a mean speed 180m/s .isentropic efficiency of the compressor may be taken as 82% calculate:
 - (1) Work done by the machine
 - (2) blades angles
 Assume $\gamma = 1.4$ and $c_p = 1.005\text{kJ/kgK}$
13. (a) Explain the working of pelton wheel with the help of velocity triangles
 (b) An inward flow reaction turbine has external & internal diameter as 1m and 0.5 m respectively. the velocity o flow through the runner is constant and is equal to 1.5m/s. determine (i) Discharge through the runner (ii) Width of the turbine at outlet if the width of the turbine at inlet =200mm.

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14. The velocity of steam exiting the nozzle of the impulse stage of a turbine is 400m/s the blades operate close to the maximum blading efficiency the nozzle angle is 20° considering equiangular blades and neglecting blade friction , calculate for a steam flow of 0.6kg/s the diagram power and the diagram efficiency .
15. A gas turbine unit receives air at 1 bar and 300k and compresses it adiabatically to 6.2 bar . the compressor efficiency is 88%. The fuel has a heating value of 44,186kj/kg and the fuel air ratio is 0.017kj/kg of air. The turbine internal efficiency is 90% calculate the work of turbine and compressor per kg of air compressed and thermal efficiency
- For products of combustion $c_p=1.147\text{kJ/kgk}$ and $\gamma=1.333$.
16. (a) How aerofoil theory is applied to turbo machinery blades
(b) What is manometric head in centrifugal pump
17. (a) A turbine develops 500kW power under a head of 100m at 200rpm what would be its normal speed and output under a head of 81m.
(b) Explain pressure compounding with the help of diagram.
(c) What is isothermal efficiency of turbine in gas turbines.

FACULTY OF INFORMATICS

B.E. 3/4 (IT) II-Semester (Main & Backlog) Examination, May / June 2018

Subject : Compiler Construction

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 Differentiate between PASS and PHASE. | 2 |
| 2 What is difference between front-end and back-end? | 2 |
| 3 Define pattern and lexeme. | 2 |
| 4 Explain difference between parse tree and syntax tree with an example. | 3 |
| 5 Explain about activation tree with an example. | 3 |
| 6 Define and explain 3-address code with an example. | 3 |
| 7 Explain format of lex program. | 3 |
| 8 What is difference between left-most and right-most derivations? | 2 |
| 9 Write regular expression for numbers. | 2 |
| 10 Draw NFA for the regular expression $ab b$ using Thompson's method. | 3 |

PART – B (5 x 10 = 50 Marks)

- | | |
|--|----|
| 11 Explain concept of recursive descent parser with an example. | 10 |
| 12 Check whether given grammar is SLR(1) or not.
$E \rightarrow E+n n$ (grammar)
$i P: n+n+n+n$ | 10 |
| 13 Consider following grammar :
$E \rightarrow E+T T$
$T \rightarrow TF F$
$F \rightarrow F* a b$ | 10 |
| a) Eliminate left recursion of above grammar. | 3 |
| b) Write rules for first and follow sets. | 3 |
| c) Write first and follow set for above grammar | 4 |
| 14 a) Explain concept of bootstrapping and porting in detail. | 5 |
| b) List and explain major data structures in a compiler. | 5 |
| 15 Explain about stack based run-time environment in detail. | 10 |
| 16 Write about code generation of control statements and logical expressions in detail. | 10 |
| 17 Write short notes on : | |
| a) Heap management | 3 |
| b) Implementation of tiny scanner | 4 |
| c) Attributes and Attribute grammar | 3 |

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) II-Semester (Main & Backlog) Examination May/June 2018

Subject: Compiler Construction

Time: 3 Hrs.

Max. Marks: 75

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

1. Define the terms “Language Translator” and “compiler” (2)
2. Write short notes on bootstrapping (2)
3. Define left recursion. Is the following grammar left recursive? (3)
 $E \rightarrow E + E | E * E | a | b$
4. What is an ambiguous grammar? Give examples . (3)
5. Define Induction variable. (2)
6. What is code optimization? Give example for any two optimization approaches. (3)
7. What is a Basic Block? (2)
8. What is an activation record? Discuss its structure. (3)
9. What are the Error-recovery actions in a lexical analyzer? (2)
10. Specify the functionality of linker, loader and compiler (3)

PART – B (50 Marks)

11. a) What are the phases of the compiler? Explain the phases in detail. Write down the output of each phase for the expression $a:=b+c*50$ (7)
- b) What are cross compilers? (3)
12. (a) Is the given grammar LL(1)? (6)
 $E \rightarrow E + T | T$
 $T \rightarrow T * F | F$
 $F \rightarrow (E) | id$
- (b) What is an LALR(1) grammar? (4)
13. (a) Check whether the following grammar is SLR(1) or not (8)
 Explain your answer with reasons.
 $S \rightarrow L = R | R$
 $L \rightarrow *R | id$
 $R \rightarrow L$
- (b) Define Kernel items and Non-kernel items. (2)
14. With a neat diagram explain the format of the Symbol Table. And discuss the tree structures representation of scope information. (10)
15. (a) Convert the following program into 3 address code (5)
 $X=0$
 do
 {
 $A=B-C*D$;
 $X=X+1$;
 }
 while($X<6$)
- (b) Discuss garbage collection in detail. (5)
16. (a) Explain DAG representation of the basic blocks with an example. (5)
- (b) Explain various machine independent code optimization techniques. (5)
17. Write short notes on any two from the following: (10)
 (a) Input Buffering
 (b) Syntax Directed Translation
 (c) Error Recovery

FACULTY OF ENGINEERING

B.E. 3/4 (M/A.E.) II-Semester (Main & Backlog) Examination, May / June 2018

Subject : CAD / CAM

Time : 3 hours

Max. Marks : 75

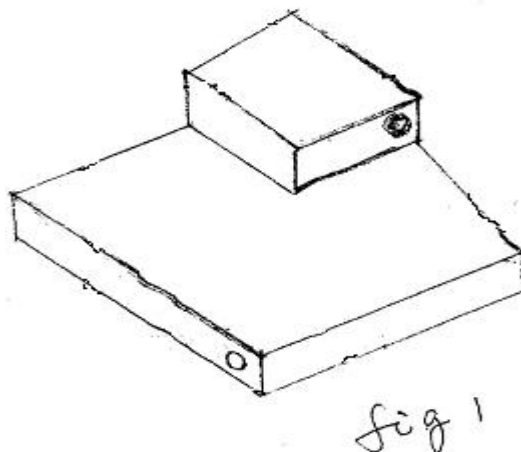
Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

- | | |
|---|---|
| 1 Define Geometric model. What are the types of geometric modeling. | 2 |
| 2 Define product life cycle. | 3 |
| 3 What is finite element modeling? | 2 |
| 4 Define the following : | 3 |
| a) Surface of revolution | |
| b) Looms surface | |
| 5 Define straight cut motion control system with neat sketch. | 2 |
| 6 Explain STEP and STL format. | 3 |
| 7 Explain classification of Robot configurations. | 2 |
| 8 Differentiate NL, LNL and DNL. | 3 |
| 9 Name types of flexible manufacturing systems. | 2 |
| 10 Write short note on the benefits of group technology. | 3 |

PART – B (50 Marks)

- | | |
|---|---|
| 11 a) The co-ordinates of 4 control points relative to a current WLS are given by $P_0 = \{2 \ 2 \ 0\}^T$; $P_1 = \{2 \ 3 \ 0\}^T$; $P_2 = \{3 \ 3 \ 0\}^T$; $P_3 = \{3 \ 2 \ 0\}^T$. Find the equation of the resulting Bezier curve. Also find on the curve for $u = 0, 1/4, 1/2, 3/4$ and 1. | 5 |
| b) Differentiate Bezier curve and cubic spline curve. | 5 |
| 12 a) What is C-rep? Draw a tree structure of the object given below (fig.1). | 5 |



- | | |
|--|---|
| b) What are the various types of 2D transformations? Derive the transformation matrix for various transformations. | 5 |
|--|---|

- 13 a) Write short notes on IGES. 5
 b) Write a part program for the part shown in the figure.2 below. The plate thickness is 20mm. All dimensions are in mm. 5

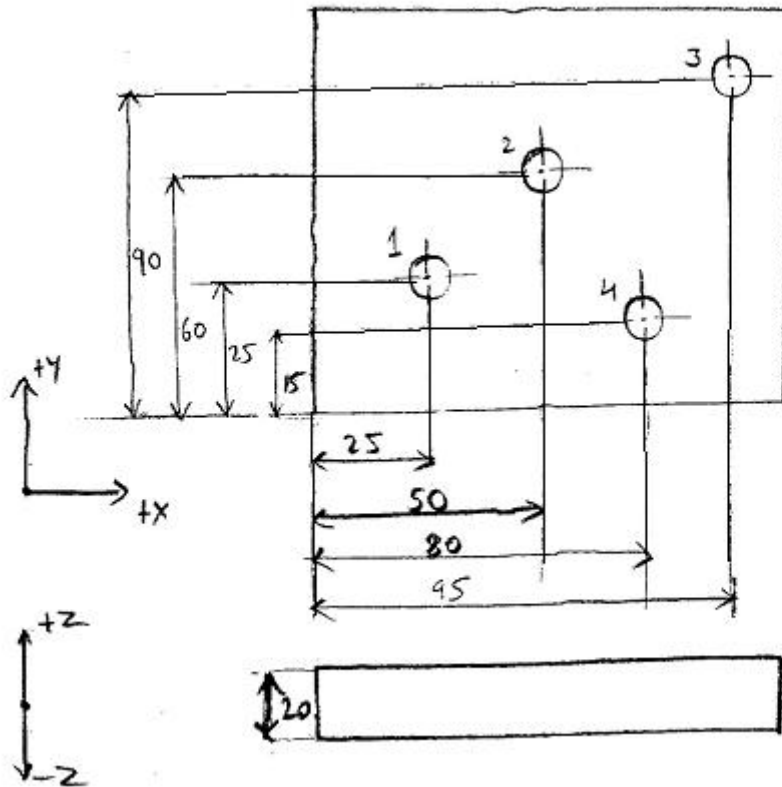


fig 2

- 14 a) What is DNC? What are the components of DNC? Explain with neat sketch. 5
 b) Define the following terms for a robot.
 i) Degree of freedom
 ii) Accuracy
 iii) Repeatability
- 15 Write short notes on variant and generative type LAPP. 10
- 16 Write short notes on : 10
 a) NURBS
 b) Mechanical tolerance
 c) Reverse Engineering
- 17 Explain the OPTIZ and MILLASS classification system of G.T. 10
