

**III B. Tech I Semester Regular Examinations, November - 2015**  
**LINEAR & DIGITAL IC APPLICATIONS**  
 (Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answering the question in **Part-A** is compulsory  
 3. Answer any **THREE** Questions from **Part-B**

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**PART -A**

- 1 a) Make a comparison between an ideal Op-amp and a practical Op-amp. [4M]
- b) Explain the different methods used to increase the input resistance of an op-amp. [4M]
- c) Define the Op-Amp parameters: (i) Input offset voltage,  $V_{io}$  (ii) Input bias current,  $I_{io}$ . [3M]
- d) Write about 566 voltage controlled oscillator. [4M]
- e) Differentiate between active and passive filters. [3M]
- f) List important specifications of Digital to Analog converters indicating their typical values. [4M]

**PART -B**

- 2 a) The common mode input of a certain differential amplifier, having differential gain of 125 is  $4 \sin 200\pi t$  V. determine the common mode output if CMMR 60dB. [4M]
- b) Analyze a dual input and unbalanced output BJT differential amplifier. [8M]
- c) For an op-amp PSRR is 70dB (min), CMRR is  $10^5$  and  $A_d = 10^5$ . The output voltage changes by 20V in 4 sec. Calculate (i) common mode gain (ii) slew rate. [4M]
- 3 a) An Op-Amp has a slew rate of  $2V/\mu$  sec. What is the maximum frequency of an output signal of peak value 5V at which the distortion sets in due to the slew rate limitation? [4M]
- b) Explain the parameters that should be considered for ac and dc applications of an Op-Amp. [8M]
- c) Draw a neat circuit diagram of an integrator circuit. Explain its functioning with the Input-Output wave forms. [4M]
- 4 a) What are the three differential amplifier configurations? Compare and contrast these configurations. [8M]
- b) What is an instrumentation amplifier? Draw a three Op-Amp dc instrumentation amplifier and derive the expression for its output. [8M]
- 5 a) Draw the circuit of an Astable multivibrator using Op-Amp and derive the expression for its frequency of oscillations. How will you modify this circuit to have independent control of ON and OFF time durations? [8M]
- b) What is a three terminal regulator? Draw a fixed voltage regulator circuit and explain its operation. Explain how the IC 7805 can be used as a current source. [8M]



- 6 a) With the aid of a circuit diagram, explain the principle of operation of second-order low pass active filter. [8M]  
b) Draw a band – pass filter circuit with its frequency response curve. Explain its working. [8M]
- 7 a) Draw the circuit diagram of dual slope integration A to D converter and state its advantages. Explain its operation with waveforms. What parameters decide its conversion speed and accuracy? [8M]  
b) Discuss the following type ADCs: [8M]  
i) Ramp type ADC and ii) Servo tracking ADC.

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**PART -A**

- 1 a) Briefly explain about FET differential amplifier. [3M]
- b) Explain the term 'Slew rate' and how it affects the frequency response of an Op-Amp. [4M]
- c) Explain tracking range and capture range of a PLL. [4M]
- d) Explain how IC 7805 can be used as a current source. [4M]
- e) Draw the frequency response characteristics of a notch filter. [3M]
- f) Define the terms 'Accuracy', 'Percentage Resolution' and 'settling time' of an Analog to Digital converter. [4M]

**PART -B**

- 2 a) Draw the circuit of BJT differential amplifier and suggest ways to improve CMRR. [4M]
- b) Consider a BJT current mirror with a nominal current transfer ratio of unity. Let the transistors have  $I_S = 10^{-15}$  A,  $\beta = 100$  and  $V_A = 100$  V. For  $I_{REF} = 1$  mA find  $I_0$  when  $V_O = 5$  V also find the output resistance. [8M]
- c) Write about level translator circuit. [4M]
- 3 a) Define the terms: PSRR, CMRR, input bias current & input offset voltage. Explain the difference between slew rate and transient response. [3M]
- b) Write about 78XX-79XX voltage regulators and explain about their use in dual power supply. [8M]
- c) Draw and explain the working of an op amp with offset-voltage compensating network. [5M]
- 4 a) With the help of a neat circuit diagram, explain the working of a logarithmic amplifier. Derive the expression for its output voltage. [8M]
- b) Draw the circuit of an Astable multivibrator using Op-Amp and derive the expression for its frequency of oscillations. How will you modify this circuit to have independent control of ON and OFF time durations? [8M]
- 5 a) Discuss with relevant circuits and waveforms the working of Monostable multivibrator using 555 timer. [8M]
- b) Draw the block diagram of a 565 PLL IC and explain its working. [8M]



- 6 a) Explain the operation of an All-pass filter. Explain why it is known as phase shift circuit. [8M]
- b) Design a band-pass active filter of second order with a mid-band voltage gain  $A_R = 50$ . Center frequency  $f_{CR} = 200$  Hz and Bandwidth = 20 Hz. [8M]
- 7 a) Write a short note on performance specifications of a digital to analog converter. [8M]
- b) Draw the circuit of weighted resistor DAC and derive expression for output analog voltage  $V_o$ . [8M]

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**PART -A**

- 1 a) Draw the BJT current mirror circuit and briefly explain its operation. [4M]
- b) Explain the different methods used to increase the input resistance of an op-amp. [4M]
- c) Sketch and explain the circuit operation of log and antilog amplifiers. [4M]
- d) Derive expression for o/p voltage 'V<sub>0</sub>' of dual -slope A/D converter. [4M]
- e) Explain different configurations of an active filter. [3M]
- f) Compare different types of ADCs. [3M]

**PART -B**

- 2 a) Draw the block diagram of the operational amplifier and briefly write about each block. [8M]
- b) Analyze the circuit of a BJT differential amplifier with emitter resistance. [8M]
- 3 a) Write about large signal voltage gain of op-amp. [3M]
- b) Define the Op-Amp parameters: (i) Input offset voltage, V<sub>io</sub> (ii) Input bias current, I<sub>io</sub> with a practical setup explain how these parameters can be measured. [8M]
- c) Explain frequency compensation techniques used in Op-Amps. [5M]
- 4 a) Design a differentiator to differentiate an input signal that varies in frequency from 10 Hz to about 1 KHz. If a sinewave of 1 V peak at 1000 Hz is applied to this differentiator, draw the output waveforms. [8M]
- b) Define the terms Upper and Lower Tripping Points of a Schmitt trigger. What is the significance of the two parameters? Explain the operation of a Schmitt trigger circuit using Comparator. [8M]
- 5 a) Draw the circuit of 555 timer IC in Astable mode to get output waveform with 50% duty cycle. [6M]
- b) Define the terms: i) free-running frequency f<sub>0</sub>, (ii) lock range, (iii) capture range, and (iv) pull-in time, pertaining to PLL. [6M]
- 6 a) Explain the term 'frequency scaling' with suitable example. [8M]
- b) Design a wide band pass filter with f<sub>L</sub> = 200 Hz, f<sub>H</sub> = 1KHz and a pass band gain = 4. Draw the frequency response and calculate 'Q' factor for the filter. [8M]
- 7 a) Explain the operation of a multiplying DAC and mention its applications. [8M]
- b) Describe AD 670 microprocessor compatible flash converter. [8M]

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**PART -A**

- 1 a) Write about current repeater circuits. [3M]
- b) For an op-amp having slew rate of 3 V/  $\mu$ sec, what is the maximum closed loop voltage gain that can be used when the input signal varies by 0.4V in 12  $\mu$  sec. [4M]
- c) Draw and explain the ideal voltage transfer characteristics of an op-amp. [3M]
- d) Write briefly about FSK demodulators. [4M]
- e) Explain the function of Wide band reject filter. [4M]
- f) Write about the basic Digital to Analog Conversion techniques. [4M]

**PART -B**

- 2 a) Explain the operation of the BJT differential amplifier with constant current source. [4M]
- b) Analyze the BJT differential amplifier with dual input and balanced output. [8M]
- c) Write about cascade differential amplifier. [4M]
- 3 a) Write about the large signal operation of an op-amp. [3M]
- b) Write about the advantages and disadvantages of 78xx and 79xx series regulators. [8M]
- c) Draw and explain the working of an op amp with offset-voltage compensating network. [5M]
- 4 a) Define the terms Upper and Lower Tripping Points of a Schmitt trigger. What is the significance of the two parameters? Explain the operation of a Schmitt trigger circuit using Comparator. [8M]
- b) Draw a neat circuit diagram of an integrator circuit. Explain its functioning with the Input-Output wave forms. Derive the output voltage  $V_0$  of an integrator circuit. [8M]
- 5 a) What is the principle of PLL? Draw the block schematic and explain the same. [8M]
- b) Discuss about any two applications of 555 timer monostable multivibrator. [8M]
- 6 a) Design a second order low-pass Butterworth filter with a cut-off frequency of 12KHz and unity gain at low frequency. Also determine the voltage transfer function magnitude in dB at 15Hz for the filter. [8M]
- b) Given a bandpass filter with resonant frequency  $f_r$  of 1000 Hz and a bandwidth of 3000Hz; Find its (i) quality factor, (ii) lower cutoff frequency and higher cutoff frequency. [8M]
- 7 a) Sketch and explain the transfer characteristic of a DAC with necessary equations. [7M]
- b) Give the schematic circuit diagram of successive approximation type A/D converter and explain the operation of this system. [9M]

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## III B. Tech I Semester Regular Examinations November - 2015

## METROLOGY

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answering the question in **Part-A** is compulsory  
 3. Answer any **THREE** Questions from **Part-B**

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**PART -A**

- 1 a) Name and sketch three main types of fits. [3M]
- b) Explain the various standards of linear measurement. [4M]
- c) What are the advantages of optical instruments over conventional measuring instruments? [4M]
- d) What is the importance of surface roughness? Mention the geometrical characteristics of a surface. [4M]
- e) Explain how various elements of screw thread are measured. [3M]
- f) Distinguish between alignment tests and performance tests on machine tools. [4M]

**PART -B**

- 2 a) Determine limit dimensions for a clearance fit between mating parts of diameter 40 mm, providing a minimum clearance of 0.10 mm with a tolerance on the hole equal to 0.025mm and on shaft 0.05mm using both systems. [6M]
- b) On what factors the variation in size depends in any manufacturing process? [4M]
- c) Differentiate between interchangeable assembly and selective assembly, with suitable examples. [6M]
- 3 a) Distinguish between line and end standards. How are end standards derived from line standards? Give examples. [4M]
- b) Discuss with suitable sketches, the method for testing for straightness by using spirit level and autocollimator. [8M]
- c) Select the sizes of angle gauges needed to build the following angles:  $22^{\circ}11'20''$ ,  $29^{\circ}54'$ ,  $31^{\circ}49'24''$ . [4M]
- 4 a) Explain the principle of measurement by light wave interference method. [4M]
- b) With the help of neat sketch explain the working principle of a tool maker's microscope. [6M]
- c) Describe the working of a profile projector. What are its applications? [6M]
- 5 a) Describe various methods of numerical assessment of surface finish. [4M]
- b) Describe with a neat sketch the construction, principle and operation of Talysurf. [6M]
- c) Differentiate between surface roughness and waviness. [6M]



- 6 a) With a neat sketch illustrate how the effective diameter of a screw thread may be checked using the three wire method. [6M]  
b) Describe a gear tooth Vernier and indicate how the tooth thickness is checked with this instrument. [5M]  
c) Describe the pitch measurement of internal screw threads by various methods. [5M]
- 7 a) Explain how a precision level can be used to determine the flatness and straightness of machine beds. [6M]  
b) Explain in detail with suitable sketches about various alignment tests performed on a lathe. [10M]

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**PART -A**

- 1 a) Define basic size, deviation, upper and lower limit of size. [3M]
- b) What are the requirements of a good dial indicator? What are the advantages of it? [4M]
- c) Sketch the various patterns of interference bands observed in the following cases: [4M]  
(i) Perfect flat surface (ii) Convex shape (iii) Concave shape and (iv) Gauge block with rounded edges.
- d) Mention the basic requirements of a comparator. [3M]
- e) Enumerate various screw thread parameters for metrological measurement. Also enlist instruments corresponding to their measurements. [4M]
- f) Describe a method to find out the flatness of surface plate. [4M]

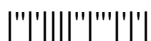
**PART -B**

- 2 a) Distinguish between hole basis system and shaft basis system. [5M]
- b) In a hole & shaft assembly of 30mm nominal size the tolerances are specified as [6M]  
Hole  $30_{-0.01}^{+0.02}$  Shaft  $30_{-0.070}^{-0.040}$  , Determine i) Maximum & Minimum clearance obtainable ii) Hole & Shaft Tolerance and iii) Type of fit it is?
- c) Discuss in detail the salient features of the systems of limits and fits as per Indian standard. [5M]
- 3 a) Explain Taylor's Principle as applicable to limit gauging with sketches. [4M]
- b) Explain the construction and use of (i) Vernier bevel protractor, (ii) Angle dekkor and (iii) Sine bar with suitable sketches. [8M]
- c) Explain the method of calibration of slip gauges. [4M]
- 4 a) Describe the working of NPL flatness interferometer with a neat sketch. [6M]
- b) Explain why monochromatic light is used for Interferometry work and not the white light. [4M]
- c) Explain how flatness errors of lapped surfaces are measured with an optical flat. [6M]
- 5 a) With the help of neat sketch explain the working principle of a reed type mechanical comparator. [8M]
- b) Indicate how various surface roughness specifications are placed relative to the symbol. [4M]
- c) Describe the working principle of profilograph. [4M]



- 6 a) What is 'best size of wire' for effective diameter measurement? Derive a relationship for the best size wire in terms of its effective diameter. [6M]  
b) Describe with the help of a neat sketch the working principle of Gear tooth vernier caliper. [6M]  
c) Describe the following terms in screw threads: [4M]  
(i) Major diameter, (ii) Minor diameter, (iii) Tooth thickness and (iv) Pitch
- 7 a) What is flatness? What are the various methods of checking flatness of surfaces? [9M]  
b) Describe how you would perform alignment tests on drilling machine. [7M]

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PART -A

- 1 a) How tolerances are specified and indicated? [3M]
- b) What is limit gauging? Sketch the different limit gauges used in industry for quality checking. [4M]
- c) What are the important uses of optical projectors? [4M]
- d) Explain the following terms with reference to surface roughness measurement: (i) CLA value (ii) Maximum peak to valley height (iii) Sampling length. [3M]
- e) Differentiate between simple effective diameter and virtual effective diameter of an external screw. [4M]
- f) Enlist the instruments and equipment essential for performing alignment tests. [4M]

PART -B

- 2 a) Differentiate between unilateral and bilateral tolerance with examples. [4M]
- b) Determine the dimensions and tolerances of the shaft and hole having the size of 25H7/f8. 25mm falls in diameter steps of 18-30. Also indicate the type of fit and show the tolerances with sketch. [8M]  
Assume the following data,  
The fundamental deviation for shaft 'f' is  $-5.5D^{0.41}$ ,  
The standard tolerance unit  $i=0.45 D^{1/3}+0.001D$ , where D is the geometric mean of the lower and upper limits of diameter step in which the diameter consideration lies, D is in mm,  
The standard tolerance for IT7=16i and IT8=25i.
- c) Explain the need for providing tolerance on a dimension. [4M]
- 3 a) With the help of sketches explain the working of an external micrometer. [5M]
- b) Explain the need for gauge maker's tolerance. Discuss how the wear allowance is provided on gauges. [6M]
- c) Describe the types of spirit levels used in metrology. Define sensitivity and level constant of a spirit level. [5M]
- 4 a) What is the difficulty in using the optical flat alone? How do you overcome this difficulty in an interferometer? [5M]
- b) Describe with a neat sketch working principle of a Michaleson's interferometer. [6M]
- c) Describe with a neat sketch working principle of a Autocollimator. [5M]



- 5 a) What are the advantages, uses and disadvantages of electrical comparators? [6M]  
b) What are various orders of geometrical irregularities on surfaces? How these are classified? [4M]  
c) The heights of peaks and valleys of 20 successive points on a surface are 35, 25, 40, 22, 37, 19, 41, 21, 42, 18, 42, 24, 44, 25, 40, 18, 40, 18, 39, and 21 microns respectively, measured over a length 20mm. Determine CLA and RMS values of roughness surface. [6M]
- 6 a) With neat sketches explain the working of a Rolling gear tester. [6M]  
b) Discuss on angle of thread, thread pitch, and profile thread gauges. [6M]  
c) Explain about total composite error and tooth to tooth composite errors. [4M]
- 7 a) Explain with suitable sketches the various alignment tests performed on Milling machine. [10M]  
b) Explicate the utility of straight edge and surface plate in laboratories. [6M]

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(Mechanical Engineering)

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**PART -A**

- 1 a) Differentiate between allowance and tolerance. [3M]
- b) Sketch a double ended plug gauge and progressive plug gauge. What are the advantage and disadvantages of one over the other? [4M]
- c) Describe the use of optical flats and monochromatic light for dimensional comparison. [4M]
- d) Explain how CLA index number is determined. [3M]
- e) Describe the tooth thickness measurement with flange micro meter. [4M]
- f) What is the effect upon the work if tail stock center line is parallel to but slightly above the head stock spindle axis? [4M]

**PART -B**

- 2 a) Bring out the salient features of British standard and ISO systems of limits and fits. [4M]
- b) Calculate the limits of hole and shaft in the hole and shaft pair designated by 40H7/d8, Assume (i) 40 lies in diameter step of 30 and 50 (ii) The standard tolerance unit  $i$  (microns) =  $0.45 D^{1/3} + 0.001D$ , where  $D$  is the geometric mean of the lower and upper limits of diameter step in which the diameter consideration lies,  $D$  is in mm (iii) The fundamental deviation for shaft  $d = -16 D^{0.44}$ , (iv) The standard tolerance for IT7=16*i* and IT8=25*i*. [8M]
- c) Discuss on causes of variation of size of a component occur in the process of manufacture. [4M]
- 3 a) Discuss the concept of wringing of slip gauges. [3M]
- b) Design the general type GO gauges and NOGO gauges for components having 20H7/f8 fit. Given Gauge tolerance = work tolerance = 10% of work tolerance. Assume the data following:  
Upper deviation of shaft 'f' is  $-5.5D^{0.41}$ ,  
The standard tolerance unit  $i = 0.45 D^{1/3} + 0.001D$ , where  $D$  is the geometric mean of the lower and upper limits of diameter step in which the diameter consideration lies,  $D$  is in mm,  
20mm falls in diameter steps of 18-30mm  
The standard tolerance for IT7=16*i* and IT8=25*i*. [8M]
- c) Briefly explain with neat sketches of (i) Profile Gauge (ii) Plug Gauge. [5M]



- 4 a) Discuss the applications of optical projectors for precision measurements. [4M]  
b) Describe with a neat sketch working principle of a NPL gauge interferometer. [6M]  
c) What are the numerous fringe contours in checking slip gauges by means of optical flats? Describe the method of experimental testing of such surfaces. [6M]
- 5 a) Discuss the following terms in connection with surface finish measurement: [4M]  
(i) Waviness, (ii) Lay, (iii) Roughness, (iv) Centre line profile.
- 6 b) Describe the working principle of a solex pneumatic comparator. [7M]  
c) Describe the working principle of an electronic comparator. [5M]
- 6 a) Explain the method to check involute profile of a screw thread. [5M]  
b) Explain the method of checking the thread form and angle. [4M]  
c) With a neat sketch explain how the simple effective diameter of a screw thread may be checked using the two wire method. [7M]
- 7 a) What is a principle of autocollimator? Discuss on applications of autocollimator? [6M]  
b) Differentiate geometric and practical tests on machine tools. [6M]  
c) What is the effect on the work, if the center T slot of a horizontal milling machine is not square with the spindle axis? [4M]

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Code No: **R31016**

**R10**

**Set No. 1**

**III B.Tech I Semester Supplementary Examinations, November – 2015**

**TRANSPORTATION ENGINEERING-I**

**(Civil Engineering)**

**Time: 3 hours**

**Max. Marks: 75**

**Answer any FIVE Questions  
All Questions carry equal marks  
(IRC charts may be permitted)**

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- 1 a) Discuss the general principles in the re-alignment of a highway and explain how the work is carried out. [8]  
b) Briefly discuss the historical development of road construction in India. [7]
- 2 a) Enumerate the various design factors controlling the vertical alignment of highways. [8]  
b) There is a horizontal curve of radius 55 m on a stretch of hill road with a gradient of 4.3%. Determine the grade compensation. [7]
- 3 a) Explain the various aspects investigated during parking studies. What are the uses of these studies? [8]  
b) A vehicle moving at 45 kmph speed was stopped by applying the brake and the length of skid mark was 13.5 m. If the average skid resistance of the pavement is known to be 0.65, determine the brake efficiency of the test vehicle. [7]
- 4 a) What are the advantages and disadvantages of traffic signals? [8]  
b) Draw a neat sketch of full clover leaf and show the movement of traffic. [7]
- 5 a) Briefly explain the Marshall method of mix design. [8]  
b) What are the various tests that are performed on bitumen? Briefly mention the principle and uses of each test. [7]
- 6 a) Write a note about the objectives and requirements of pavements. [8]  
b) Discuss the advantages and disadvantages of CBR method of pavement design. [7]
- 7 a) Write a note about modulus of sub grade reaction, radius of relative stiffness and radius of resisting section. [8]  
b) Compute the equivalent radius of resisting section of 28 cm slab, given that the radius of contact area wheel load is 18 cm. [7]
- 8 a) List the different methods of road construction. Enumerate their advantages and disadvantages. [8]  
b) Compare the following methods of bituminous road construction: [7]  
(i) central plant mix and road mix, (ii) hot mix and cold mix.

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Code No: **R31026**

**R10**

**Set No. 1**

**III B.Tech I Semester Supplementary Examinations, November - 2015**

**LINEAR & DIGITAL IC APPLICATION**

**(Electrical and Electronics Engineering)**

**Time: 3 hours**

**Max. Marks: 75**

**Answer any FIVE Questions  
All Questions carry equal marks**

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- 1 a) Define Integrated Circuit. Explain the different types of IC's. [8]  
b) Discuss about DC analysis of dual input balanced output amplifier. [7]
- 2 a) Define amplifier. Enlist the characteristics of Op-amps [7]  
b) Explain the terms CMMR, PSRR, slew rates and offset voltages of Op-amp. [8]
- 3 a) Draw and explain the triangular wave generator by using Op-amp. [7]  
b) Draw the anti log amplifiers by using Op-amp and explain its operation. [8]
- 4 a) Draw the block diagram of PLL and explain its operation. [7]  
b) Draw and explain the functional diagram of 555 timer [8]
- 5 a) Draw the inverted R-2R OAC and explain its operation. [8]  
b) Draw the successive approximation ADC and explain its operation. [7]
- 6 a) Explain about Multiplexers and Demultiplexers with example. [8]  
b) Explain the Ripple Adder and Binary Parellel Adder [7]
- 7 a) What is meant by sequential logic design? Explain about Latches and flip-flops with suitable examples. [10]  
b) Explain the JK flip flop circuit diagram. [5]
- 8 Discuss about the following with examples. [15]  
(i) Programmable Logic Array (ii) Programmable Array Logic Devices.

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Code No: **R31036**

**R10**

**Set No. 1**

**III B.Tech I Semester Supplementary Examinations, November - 2015**

**METAL CUTTING & MACHINE TOOLS**

**(Mechanical Engineering)**

**Time: 3 hours**

**Max. Marks: 75**

**Answer any FIVE Questions  
All Questions carry equal marks**

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- 1 a) During an orthogonal cutting a chip length of 160mm was obtained from an uncut chip length of 350 mm. The cutting tool has  $22^{\circ}$  rake angles and a depth of cut is 0.8mm. Determine the shear plane angle and chip thickness. [7]  
b) Give in summary form the factors influencing formation of various types of chips. [8]
- 2 What is the working principle of lathe? Explain briefly the parts of a lathe? How is the size of lathe specified? [15]
- 3 a) What is the principle of working of shaper? [6]  
b) State the advantages, limitations and applications of shaper. [9]
- 4 Discuss in detail the following with neat sketches: [15]  
i) Drilling operations (ii) Jig boring machine.
- 5 Explain briefly with neat sketches: [15]  
i) Conventional milling process ii) Straddle milling iii) form milling.
- 6 a) How is grinding classified? [3]  
b) Discuss in detail about internal cylinder grinding. [12]
- 7 a) Explain briefly about clamping screws. [8]  
b) Enumerate and explain any one type of fixtures. [7]
- 8 a) What are the functions of CNC? [5]  
b) List out the advantages and disadvantages of CNC machines. [10]

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Code No:R31056

# R10

**Set No. 1**

III B.Tech I Semester Supplementary Examinations, November - 2015

## OPERATING SYSTEMS

(Common to CSE and IT)

**Time: 3 hours**

**Max. Marks:75**

**Answer any FIVE Questions  
All Questions carry equal marks**

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- 1 a) What are the different types of operating systems? Explain them in detail. [8]  
b) What are the main characteristics of Real time operating system? [7]
- 2 a) How scheduling algorithms are evaluated? [7]  
b) What are the advantages and disadvantages of threads? [8]
- 3 a) What is need for concurrency? How the processes are executed concurrently? [8]  
What are the problems with it?  
b) What is synchronization?How it is achieved using software and hardware? [7]
- 4 a) Explain the memory management technique Paging. [8]  
b) Explain how segmentation works. [7]
- 5 a) What is the need for page replacement? [7]  
b) How do you compare the page replacement algorithms? [8]
- 6 a) What is Safe-state? Write the Bankers algorithm for deadlock avoidance and explain it with the help of an example. [8]  
b) What are the necessary conditions that lead to deadlock and define strategies for deadlock prevention? [7]
- 7 a) Explain in detail different file allocation methods. [8]  
b) What is the need for file defining, sharing and managing? How these are achieved in Linux and windows environment? [7]
- 8 a) Explain the working of SCAN Disk scheduling algorithm. [8]  
b) What is SAN? Explain how space is managed on a disk. [7]

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Code No: V3107

**R07**

**Set No. 1**

**III B.Tech I Semester Supplementary Examinations, November – 2015**

**LINEAR SYSTEM ANALYSIS**  
**(Electrical and Electronics Engineering)**

**Time: 3 hours**

**Max. Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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- 1 a) Explain any one method of modeling of a system using phase variables, for state space representation. [8]  
b) Obtain the state model of the system for the following transfer function: [8]  
$$\frac{\text{Output}}{\text{input}} = \frac{3s^2 + 2s + 5}{s^3 + 6s^2 + 12s + 6}$$
- 2 a) Explain about the wave symmetry. [6]  
b) State and explain Parseval's theorem. [10]
- 3 The voltage across a circuit is  $V(t) = 50\cos(\omega t - 60^\circ)$  volt, while the current in the circuit is  $i(t) = 10\sin(\omega t + 30^\circ)$  amp. Calculate (i) Instantaneous power (ii) average power (iii) reactive power (iv) complex power. [16]
- 4 Explain the following: [8]  
a) Shifting theorem [8]  
b) Convolution Integral.
- 5 a) Discuss the properties of positive real function. [8]  
b) Check whether the polynomial  $2s^4 + 4s^3 + s^2 + s + 8$  is Hurwitz or not. [8]
- 6 a) Synthesize the function  $z(s) = \frac{4(s+1)(s+3)}{S(s+4)}$  using Cauer form I of Realization. [8]  
b) Using Foster form II, synthesize the function  $z(s) = \frac{(s^2 + 5)(s^2 + 13)}{S(s^2 + 8)}$ . [8]
- 7 a) Write short notes on (i) band pass sampling (ii) auto correlation function. [8]  
b) Distinguish between correlation and convolution. [8]
- 8 Write short notes on the following: [16]  
a) continuous and discrete time signal  
b) periodicity of discrete time signal  
c) region of convergence  
d) properties of z – transform.

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