Code No. 2524 / CBCS

FACULTY OF ENGINEERING

B.E. (Civil) III – Semester (CBCS) (Backlog) Examination, December 2019

Subject: Electrical Technology (PART A)

Time: 1½ Hours **Max.Marks: 38**

Note: Answer all questions from Part-A and any Three questions from Part-B

PART – A (7x2 = 14 Marks)

1 What is the phase difference between current and voltage of pure inductive circuit?
2 What is the difference between resistance and impedance?
3 What is the turns ratio of a 100 KVA, 11000 / 550 V, 50 Hz transformer?
4 What is critical resistance of a DC shunt generator?
5 What is the relationship between line and phase quantities of current and voltage of delta system?
6 Define slip and give mathematical expression.
7 Name the two windings in the single phase induction motor.

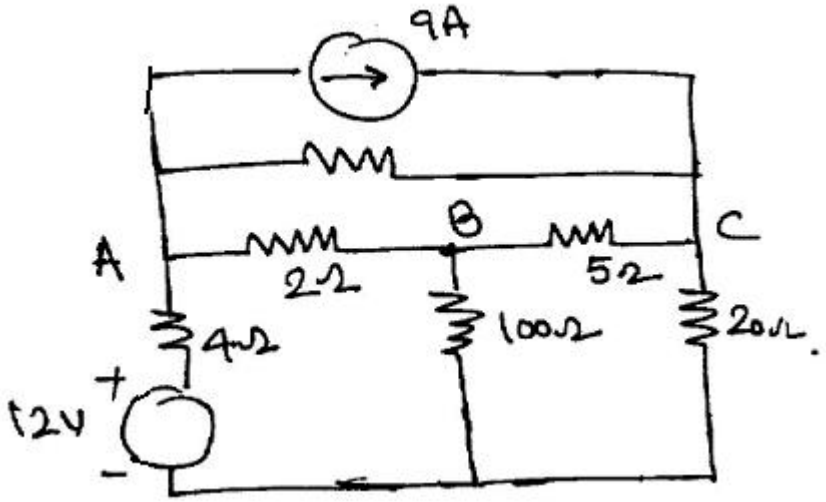
PART – B (24 Marks)

8 a) A balanced star connected load of (8+J6) Ω/Ph is connected to a balanced 3 phase, 400 V supply. Find the line currents and power drawn from the supply. 4
b) Explain the transformer on load condition. 4

9 a) A coil takes a current of 6A when 24DC supply is connected and the same current is drawn when 30V, 50 Hz Ac is connected, find the parameters of the coil. 4
b) State and explain KCL and KVL. 4

10 a) Draw and explain Scar-Delta starter. 4
b) The armature of a 4 pole dc shunt generated is lap wound and generates 216 V, when running at 600 rpm. Armature has 144 slots with 6 conductors per slot. If it is rewound with wave would, and run at 500 rpm, what is the emf generated with same flux. 4

11 a) What are the speed control methods of DC motor. 4
b) Determine the voltage across 5Ω resistance and current in the 12 V source. 4



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Code No: 2525

FACULTY OF ENGINEERING

B.E. III-Semester (Civil) (CBCS) (Backlog) Examination, December 2019

Subject : Mechanical Technology (Part-B)

Time : 3 Hours **Max. Marks: 37**

Note: *Answer all questions of Part - A and answer any Three questions from Part-B.*

PART - A (13 Marks)

1	Explain Belt Conveyor.	2
2	What is a Rock Drill?	3
3	Write the uses of Stationary Screen	3
4	What do you understand by Passenger Lift?	2
5	Write the applications of Excavating Equipment.	3

PART- B (24 Marks)

6.	(a) Differentiate between Bucket wheel Excavator and Cable Excavator	4
	(b) What are the precautions for handling earth moving equipments.	4
7.	(a) Differentiate between Apron Conveyor and Belt Conveyor?	4
	(b) Write a note on tower crane.	4
8.	With a neat sketch explain Reciprocating Air Compressor and its uses.	8
9.	(a) Explain Whirler Crane and write its uses.	4
	(b) Write advantages and disadvantages of a Gyrator?	4
10.	Explain (a) Worm Geared Chain Hoists. (b) Pneumatic Jack Hammer (c) Rock Drill	8

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Code No.2531/CBCS/BL

FACULTY OF ENGINEERING

B. E. (EE/Inst.) (CBCS) III – Semester (Backlog) Examination, December 2019

Subject: Electronic Engineering - II

Time: 3 hours **Max. Marks: 70**

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

PART – A (10 x 2 = 20 Marks)

1. What is the effect of cascading of amplifiers on gain and bandwidth? 2
2. Draw frequency response of an amplifier and explain different frequency regions on it. 2
3. The input and output impedances of an amplifier are 1KΩ and 5KΩ respectively. Gain = 100, feed back ratio = 0.04. Calculate the input and output impedances of a current series feedback amplifier. 2
4. Explain the feedback concept with a block diagram. 2
5. Define Barkhunsen's criterion for oscillations. 2
6. Find the operating frequency of a Hartley oscillator if L1 = 50mH, L 2 = 30mH and C = 10uF. 2
7. Define efficiency, distortion and power dissipation in power amplifiers. 2
8. Classify power amplifiers based on biasing condition. 2
9. Sketch the double biased clipper circuit and its transfer characteristics. 2
10. Define %tilt of differentiator. 2

PART – B (5 x 10 = 50 Marks)

11. (a) Draw the circuit of a RC coupled amplifier and derive for its mid frequency and low frequency gains. 6
    (b) The voltage gain of a single stage amplifier is 20, bandwidth is 10 KHz. Three such stages are cascaded. Find the overall voltage gain and bandwidth. 4

12. (a) Draw the Current shunt feedback amplifier block diagram and derive for A_{If}, R_{if} and R_{of}. 5
    (b) Compare types of feedback amplifiers in terms of various parameters. 5

13. Draw and explain Hartley oscillator and derive its operating frequency. 10

14. (a) Draw the circuit of Complementary Symmetry Power Amplifier and explain its working. 6
    (b) In a class A power amplifier $V_{CE\ Max}$ = 20 V and $V_{CE\ Min}$ = 1V. Find overall efficiency for (i) Series fed load (ii) Transformer coupled load. 4

15. (a) Draw and explain the RC high pass circuit response for a square wave input. 5
    (b) What is a Clamper? Explain the negative peak clamper circuit. 5

16. (a) What are the advantages of negative feedback amplifiers? 5
    (b) Define clamping circuit theorem and prove it. 5

17. Write short notes on the following: 10
    (a) Coupling methods in amplifiers.
    (b) Crystal Oscillator.
    (c) Harmonic distortion in amplifiers.

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Code No: 2537/CBCS

FACULTY OF ENGINEERING

B.E. III-Semester (CBCS) (ECE) (Backlog) Examination, December 2019

Subject : Elements of Mechanical Engineering

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

Note: *Answer all questions of Part - A and answer any five questions from Part-B.*

PART - A (10 x 2 = 20 Marks)

1. Define entropy and enthalpy
2. State first law of thermodynamics
3. Explain closed, open and isolated system
4. Explain IP and BP as applied to I.C. engine
5. How do you define thermal conductivity of a material?
6. State Wein's displacement law
7. Write about the concept of Black body
8. Define slip and velocity ratio in belt drives
9. Draw a neat sketch of a spur gear. Write the nomenclature
10. Compare arc welding and gas welding.

PART-B (5x10=50 Marks)

11 (a) Define and explain second law of thermodynamics with an example 4

(b) A heat engine receives heat at the rate of 1500 kJ/min. and gives an Output of 8.2 kw. Determine Thermal efficiency and rate of heat rejection 6

12 (a) Distinguish between the following with respect to air cycle, Petrol engine and diesel engine 4

(b) A six – cylinder, four stroke petrol engine having a bore of 90mm and stroke of 100mm has a compression ratio of 7. The relative efficiency with reference to indicated thermal efficiency is 55% when the indicated specific fuel consumption is 0.3kg/kwh. Estimate the calorific value of the fuel and fuel consumption (in Kg/h). given that IMEP is 8.5 bar and speed is 2500rpm 6

13 (a) Derive the expression for the work done in a single stage compressor neglecting the effect of clearance

i) When the compression follows the law PV^n=const.

ii) When the compression is isothermal 6

(b) Define clearance volume, mechanical efficiency, overall efficiency and volumetric efficiency of a single – stage compressor 4

14 (a) Derive an expression for the LMTD for parallel flow heat exchanger 4

(b) If the inner and outer surface temperatures of simple brick wall are 40^oc and 20^oc. Calculate the rate of heat transfer per m^2 of surface area of the wall having a thickness of 250mm. Assume K for brick as 0.52 W/m^oc 6

15 (a) Explain simple gear train and compound gear train 5

(b) Derive an expression for the length of belt in open belt drive 5

16 (a) What are the different operations carried out on a lathe? Explain taper turning in detail with a sketch 5

(b) Describe various rolling processes 5

17 Write short notes on the following :

(a) Air compressors 3

(b) USM 4

(c) Metal milling operations with neat sketch 3

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Code No. 2541/ CBCS

FACULTY OF ENGINEERING

B.E III Semester (CBCS) (M/P/AE) (Backlog) Examination, December 2019

Subject: Mechanics of Materials

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

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

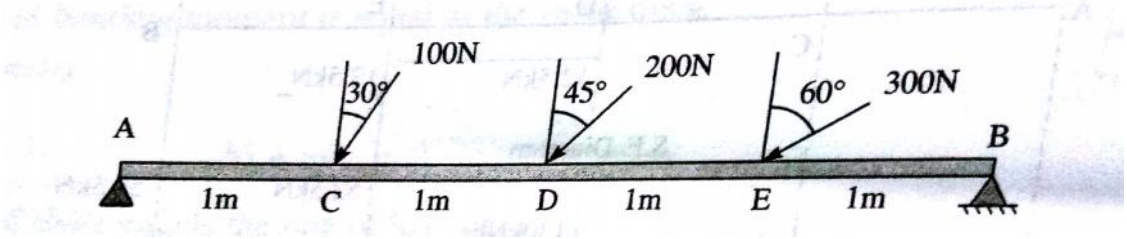
PART – A (2 X 10 = 20 Marks)

1. Define Elasticity and Plasticity. [2]
2. Define Poisson's ratio & Factor of safety. [2]
3. Define Shear force and Bending moment. [2]
4. Draw the Shear force and bending moment for cantilever of length 'L' carrying a point load 'W' at the free end. [2]
5. What are the assumptions made in the theory of simple bending? [2]
6. Find an expression for section modulus for a rectangular section? [2]
7. What do you mean by slope and deflection? [2]
8. A wooden beam of 4 m long, simply supported at its ends, is carrying a point load of 7.25 KN at its centre. If E for the beam is 2×10^5 N/mm^2 and I = 1×10^8 mm^4 then find maximum slope and deflection. [2]
9. The shearing stress of a solid shaft is not to exceed 40 N/mm^2. When the torque transmitted is 20000 N-m. Determine the minimum diameter of the shaft. [2]
10. Define Resilience, Proof Resilience and Modulus of Resilience. [2]

PART – B (5 x10 = 50 Marks)

11. A gun metal rod 22 mm diameter screwed at the ends passes through a steel tube 25mm internal diameter and 30mm external diameter. The temperature of the whole assembly is raised to 126^{0}C and the nuts on the rod are then screwed lightly home on the ends of the tube. Find the intensity of stress in the rod and the tube when the common temperature has fallen to 16^{0}C.
    Coefficient of linear expansion for steel = 12×10^{-6} per ^{0}C
    Coefficient of linear expansion for gun metal = 20×10^{-6} per ^{0}C
    Modulus of elasticity for steel = 2.1×10^5 N/mm^2
    Modulus of elasticity for gun metal = 0.94×10^5 N/mm^2. [10]

12. Draw Shear force and Bending Moment diagrams of given Simply supported beam . [10]



13. Prove the relation $\frac{M}{I} = \frac{\sigma}{y} = \frac{E}{R}$ for simple bending. [10]
14. A cantilever of length (l) carries a point load (W) at a distance 'a' from the fixed end find the slope and deflection at the free end. [10]
15. Find the diameter of the shaft required to transmit 60KW at 150 r.p.m. if the maximum torque is likely to exceed the mean torque by 25% for a maximum permissible shear stress of 60 N/mm^2. Find also the angle of twist in degrees for a length of 2.5 meters. Take modulus of Rigidity = 8×10^4 MN/ m^2. [10]

…..2

16. A bar of 30 mm diameter is subjected to a pull of 60 KN. The measured extension on a gauge length of 200 mm is 0.09 mm and the change in diameter is 0.0039 mm. Calculate
    a) Poisson's ratio
    b) Modulus of Elasticity
    c) Modulus of Rigidity
    d) Bulk Modulus. [10]

17. A simply supported beam of span 10 m carry as UDL of 10 KN/m over a length of 3 m from left support and also from right support. Draw SF and BM diagram. [10]

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Code No.2549/CBCS

FACULTY OF ENGINEERING

B. E. (CSE) (CBCS) III – Semester (Backlog) Examination, December 2019

Subject: Basic Electronics

Time: 3 hours **Max. Marks: 70**

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

PART – A (20 Marks)

1.	What is drift current?	2
2.	What are the differences between HWR and FWR?	2
3.	Define Amplification factor of JFET.	2
4.	Define alpha, beta and gama for BJT.	2
5.	What is Damped Oscillations?	2
6.	What is the effect of Negative feedback on gain and Bandwidth?	2
7.	Draw the Equivalent circuit of op-amp.	2
8.	Implement the half subtractor using logic gates write the truth tables.	2
9.	What are the different anodes in CRO?	2
10.	Explain the difference in LED and Photo Diode.	2

PART – B (50 Marks)

11.	(a) Derive the value for ripple factor and efficiency of full wave rectifier.	7
	(b) What is T U F? What is its significance?	3
12.	(a) Draw the Common emitter amplifier and Derive the value for its voltage gain.	5
	(b) What are the different biasing methods of BJT?	5
13.	(a) Draw a neat circuit diagram of the CLAPP oscillator and explain its working.	5
	(b) Derive the condition of oscillations for CLAPP Oscillator.	5
14.	(a) Draw the Voltage shunt feedback Op-amp and derive its output.	5
	(b) What are the characteristics of Ideal OP-AMP?	5
15.	Explain the construction and V-I characteristics of UJT.	10
16.	(a) Explain the working of Bridge full wave rectifier.	5
	(b) What is the role of filters with respect to ripple factor? Explain.	5
17.	Write short note	
	(a) LCD.	3
	(b) Applications of diode.	3
	(c) Data acquisition system.	4

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Code No. 2555/CBCS

FACULTY OF ENGINEERING

B.E III – Semester (CBCS) (I.T) (Backlog) Examination, December 2019

Subject: Probability and Random Processes

Time: 3 hours **Max. Marks: 70**

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

PART – A (20 Marks)

1. Write axiomatic definition of probability. 2M
2. If A, B & C are any three events such that
   $P(A) = P(B) = P(C) = 1/6$, $P(A \cap B) = P(B \cap C) = 0$ and $P(A \cap C) = 1/12$.
   Find the probability that at least one of the events A, B, C occurs. 2M
3. The amount of waiting time a customer spends at a restaurant has exponential distribution with a mean value of 5 minutes. Find the probability that the customer will spend more than 10 minutes in the restaurant. 2M
4. If a random variable X is uniformly distributed over (0, 100), Find its mean & variance. 2M
5. Write any two properties of joint probability density function of two random variables. 2M
6. For a random variable X, prove that $Var(aX + b) = a^2 Var(X)$, where a & b are constants. 2M
7. Define stationary process. 2M
8. Write any two properties of Auto-correlation. 2M
9. State Wiener-Kintchine theorem. 2M
10. Define White Noise and give its power spectral density. 2M

PART – B (50 Marks)

11. (a) Two persons A and B alternately throw a pair of die. A wins, if he gets the sum of two dice 5 before B gets 4. B wins, if he gets the sum of two dice 4 before A gets 5. If A starts the game, find the probability that B wins the game? 4M

    (b) For a binary communication channel the probability that a transmitted 0, received as 0 is 0.95. The probability that a transmitted 1, received as 1 is 0.9. If the probability that a 0 is transmitted is 0.4, Find the probability that 6M
    i) 1 is received.
    ii) If 1 is received, What is the probability that 1 was transmitted?

12. (a) The Probability Density Function (pdf) of a continuous random variable X that can take values between X = 1 and X = 4 is given by f(x) = k.(1+x) Find 6M
    i) k
    ii) Mean
    iii) Variance

    (b) If a continuous RV 'X' has a pdf $f_x(x) = 2x$; $0 < x < 1$. Find the pdf of Y such that 4M
    $Y = 4X^2$.

13. Two random variables X & Y are jointly distributed over the region $0 < x < y < 1$ as
    $f(x, y) = \{ kx ; 0 < x < y < 1$
    $\{0 ; \text{otherwise.}$ Find
    i) k ii) Means of X & Y
    iii) Variances of X & Y iv) Co-variance of X & Y 10M

contd…2

14. (a) What are the necessary and sufficient conditions for a process to be stationary? 3M
    (b) Show that the process X(t) = 10cos(5t + θ),where θ is a uniformly distributed over (0, 2π) is 7M
    i) Mean Ergodic
    ii) Auto-correlation Ergodic.

15. Consider a white Gaussian noise of zero mean and power spectral density No/2 applied to a low-pass RC filter whose transfer function is given below. Find the auto-correlation function of the output random process.

$$H(f) = \frac{1}{1 + i\,2\pi f RC}$$

10M

16. (a) A person X speaks truth 7 out of 9 times. A die is rolled & he reports that it is a 1. Find the probability that it was actually a 1. 5M
    (b) Derive the expressions for mean & variance of binomial random variable. 5M

17. (a) For the joint probability distribution of two discrete random variables X& Y given below. Find 6M
    i) P(X< 2, Y< 3)
    ii) P(X< 2/Y< 3)
    iii) P(X+Y< 4)

X/Y	1	2	3
1	4/36	3/36	2/36
2	3/36	7/36	5/36
3	5/36	2/36	5/36

    (b). Suppose that customers arrive at a bank according to a Poisson process with mean rate of 3 per minute. Find the probability that during a time interval of 2 minutes. 4M
    (i) exactly 4 customers arrive
    (ii) more than 4 customers

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Code No. 2128

FACULTY OF ENGINEERING

B.E. 3/4 (Civil) II-Semester (Backlog) Examination, December 2019

Subject : Soil Mechanics

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 void ratio and porosity. 2

2 A dry soil mass weighed 260gm and occupied a total volume of 120cc. When this soil is poured into a jar filled with water, the water level raised from 500 to 600cc. Determine specific gravity. 2

3 Differentiate "coefficient of permeability" with "coefficient of percolation". 2

4 What is the "Capillary rise" of water at 4^0c in a soil mass having average pore size 0.10mm? 2

5 Differentiate between normally consolidated and over consolidated soils. 2

6 What are the factors that affect compaction? 3

7 Differentiae a "UV test" with "CD test". Which of these provide effective shear parameters? 3

8 In a direct shear test a clean dry sand sample failed at a shear stress of 30 kPa when the normal stress was 50 kPa. Determine shear parameters of the soil. 3

9 Cohesion increases the active earth pressure and deceases the passive earth pressure, answer yes or no and justify your answer. 3

10 Determine the un-supported depth of excavation in a pure cohesive soil with unconfined compressive strength of 100 kPa and γ = 18 kN/cu.m. 3

PART – B (50 Marks)

11 a) Explain the procedure for determination of field density using sand replacement method. 5

b) A soil has liquid limit and plastic limit of 47% and 33% respectively. If the volumetric shrinkages at the liquid limit and plastic limit are 44% and 29%, determine the shrinkage limit. 5

..2

12 a) Explain the mechanism involved in "Quick sand phenomenon" and derive the expression for critical hydraulic gradient. 5

b) A falling head permeability test was performed on a sample of clean sand. The initial hydraulic head was 900mm, the final head was 400mm, and 60 sec were required for water level in the stand pipe to fall. The cross sectional area of stand pipe was 100 mm^2. The sample was of 40mm diameter, and had a length of 180mm. Determine the coefficient of permeability using Darcy's law. 5

13 a) Discuss the spring analogy for primary consolidation. What are its uses? 5

b) The data from a IS Heavy compaction test are as given below :

Weight of soil in the mould (gm)	1710	1830	2160	2205	2235
Water content (%)	4.40	5.70	7.30	9.10	12.40

Plot the moisture density curve, consider G = 2.68 and determine

i) MDD, OMC ii) Draw zero air void line. 5

14 a) Derive the expression for shear strength of soil using vane shear test. 5

b) The results obtained from an undrained shear box test on a soil are shown in table. Determine the strength parameters interms of total stresses. The cross sectional area of the shear box was 36m^2. 5

Normal load (N)	250	500	750
Failure load (N)	320	460	610

15 a) Explain the Swedish slip circle method and derive the expression for factor of safety. 5

b) A 9m high retaning wall with a vertical face is supporting a backfill with horizontal top consisting of two types of soils. The water table is located at a depth of 5m below the top. The properties of soil from 0 to 3m include c = 0, Φ = 400, γ = 18.5 kN/cu.m, γsub = 20.5 kN/cu.m. Plot the distribution of active earth pressure and determine the magnitude and point of action of total active earth pressure acting on the retaining wall. 5

16 a) What is the use of classification of soils? Discuss Indian standard classification system. 5

b) Discuss the factors affecting coefficient of permeability. 5

17 a) Write a detailed note on field compaction methods. 5

b) What is Mohr's circle? Discuss its important characteristics. 5

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Code No. 2136

FACULTY OF ENGINEERING

B. E. ¾ (EEE) II – Semester (Backlog) Examinations, December 2019

Subject: Digital Signal Processing

Time : 3 Hours **Max. Marks: 75**

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

PART – A (25 Marks)

1. Determine the fundamental period of the signal $x(n) = \sin 23\pi n/108$. [2]
2. $y(n) = x(n)\cos 2\pi fn$; determine whether the signal $y(n)$ is linear or non-linear and also time variant or time invariant. [3]
3. How number of calculations will be reduced in FFT? [2]
4. How to determine IDFT using FFT algorithms? [2]
5. $X(n) = \dfrac{2}{(z-2)(z-3)}$, determine causal signal using inverse Z transforms. [3]
6. $y(n) = x(n) + 2x(n-1) + 3x(n-2) + 2x(n-3) + x(n-4)$, construct linear phase realization of the system. [3]
7. What is warping effect? How to overcome it? [2]
8. When IIR filters are chosen over FIR filters? [2]
9. What are the applications of DSP in speech processing? [3]
10. Give the features of Digital Signal Processor which increases it's speed of operation. [3]

PART – B (50 Marks)

11. (a) Find the convolution of the following signals. [7]

$$x(n) = 3^n u(-n); h(n) = \left(\frac{1}{3}\right)^n u(n-2)$$

(b) Determine whether the following signals energy signals or power signals? [3]

12. (a) Casual LTI system is represented by difference equation. [5]

$$y(n) - \frac{3}{4}y(n-1) + \frac{1}{2}y(n-2) = 2x(n) + \frac{3}{2}x(n-1)$$

Determine the output of the system for the input $x(n) = \left(\frac{1}{4}\right)^n u(n)$, with initial conditions $y(-1) = 0; y(-2) = 1$

(b) State and prove symmetry properties of DTFT. [5]

13. (a) Draw radix-2 DITFFT algorithm for N = 16. [5]

(b) Determine DFT of the discrete time signal $x(n) = \{1,2,3,4\}$ [5]

14. Obtain the direct form II and parallel ffrm realizations for the following transfer function. [10]

$$H(z) = \frac{\left(1+z^{-1}\right)\left(1+2z^{-1}\right)}{\left(1+\frac{1}{2}z^{-1}\right)\left(1-\frac{1}{4}z^{-1}\right)\left(1+\frac{1}{8}z^{-1}\right)}$$

..2

15. (a) Design a Butterworth pass tilter for the specifications given [7]
    (i) -3db cut of frequency of 500Hz
    (ii) -40 cut of frequency of 1000Hz
    (b) Determine the H(z) for the following system using step invariant method. [3]

$$H(s)\frac{3}{(s+1)(s+3)}$$

16. Design a digital high pass filter with cut off frequency of 1 rad./ sec using hamming window with N = 7. [10]

17. (a) Draw the architechture of ADSP. [7]
    (b) Differentiate between periodic convolution and circular convolution. [3]

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Code No. 2141

FACULTY OF ENGINEERING

B.E. 3/4 (Inst.) II-Semester (Backlog) Examination, December 2019

Subject : Digital Signal Processing

Time: 3 Hours **Max. Marks: 75**

Note: Answer all questions of Part – A and answer any five questions from Part-B.

PART – A (25 Marks)

1 What are the different types of signal representation? 2

2 For each of the following systems described by difference equations, determine whether the system shift- Invariant or not? 2
(i) y(n)=x(2n) (ii) y(n)=x(n)+n.x(n+1)

3 Distinguish between linear convolution and circular convolution. 3

4 Find the DFT of the signals(i) x(n)=δ(n) (ii) x(n)= a^n 3

5 What is warping effect? What is its effect on magnitude and phase response? 3

6 For given H(s)= $\frac{2}{(s+1)(s+2)}$. 3
Obtain H(Z) using impulse invariant technique.

7 Compare FIR and IIR filters. 2

8 Mention the need for employing window technique in FIR filter Design. 2

9 What is pipelining? What are the different phases in pipelining? 3

10 What are the factors that influence the selection of DSPs? 2

PART – B (50 Marks)

11 i) Define stability and causality? 2
ii) Derive the expression for condition for stability? 5
iii) Write short notes on classification of signals? 3

12 Perform the linear convolution on the following sequences using DFT and IDFT technique. 10
$x_1(n)$= {1,2,3,1} $x_2(n)$= {4,3,2,2}

13 For the given x(n) = {1,1,1,1,1,1,0,0 } , obtain X(K) using Decimation-in- Time (DIT) FFT Algorithm . 10

14 (a) Obtain the Direct Form-II realisation for the following system 5

$$H(z) = \frac{1+\frac{1}{4}z^{-1}}{(1+\frac{1}{2}z^{-1})(1+\frac{1}{2}z^{-1}+\frac{1}{4}z^{-2})}$$

(b) Realise the following system function using minimum number of multipliers. 5

$$H(z) = 1+\frac{1}{3}z^{-1}+\frac{1}{4}z^{-2}+\frac{1}{4}z^{-3}+\frac{1}{3}z^{-4}+z^{-5}$$

15 Design a digital Butterworth filter satisfying the constraints 10

$0.8 \le |H(e^{j\omega})| \le 1$ for $0 \le \omega \le 0.2\pi$

$|H(e^{j\omega})| \le 0.2$ for $0.6 \le \omega \le \pi$

Using Impulse Invariant Transformation method

16 Design an ideal high pass FIR filter with frequency response 10

$H_d(e^{j\omega}) = 1$ for $-\pi/4 \le \omega \le \pi$

$= 0$ for $|\omega| \le \pi/4$

Find the values of h(n) for N=11 and also H(z) using Hamming Window

17 Explain in detail about general purpose digital signal processors and also the selection of DSPs? 10

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Code No. 2145 / O

FACULTY OF ENGINEERING

B.E. 3/4 (Inst.) II-Semester (Old) Examination, December 2019

Subject: Digital Signal Processing & Applications

Time: 3 Hours **Max. Marks: 75**

*Note: Answer **all** questions of Part - A and answer any **five** questions from Part-B.*

PART – A (25 Marks)

1 List the applications of digital signal Processor. (2)
2 Compare Butterworth and Chebyshev filters. (2)
3 Find DTFT of the sequence x(n)={4,-6,7,-9}. (3)
4 What is Sampling and Quantizing. (3)
5 Write short note on Impulse invariant method. (3)
6 Write the window function of Bartlet window. (3)
7 Write the properties of Twiddle factor. (2)
8 Compare General purpose and Special purpose Processors. (3)
9 Define Energy and Power signals. (2)
10 Compare FIR and IIR filters. (2)

PART – B (5x10=50 Marks)

11 Obtain direct form II and Cascade form structures of the given system. (10)

$$H(z) = \frac{(1+0.1z^{-1})(1+0.7\,z^{-1})}{(1+0.25\,z^{-1})(1-0.5\,z^{-1})(1+0.15\,z^{-1})}$$

12 Design a linear FIR Lowpass filter using rectangular window by taking 9 samples of window sequence and with cut off frequency of $\omega_c=0.2\pi$ rad/sec. (10)

13 Design a low pass Butterworth filter that has 3dB cut off frequency of 1.5KHz and an attenuation of 40dB at 3KHz. (10)

14 a) Determine whether the following systems are Linear, Time Invariant and Causal (4)
   i) y(n)=x(-n-2)
   ii) $y(n)=e^{-x(n)}$

   b) Find the linear and circular convolution of the following sequence x(n)={2,3,1,6}, h(n)={1,5,6,-1} (6)

15 Find 8-point DFT of the sequence x(n)={1,2,4,8,4,6,9,3} by Radix-2 DIF FFT. (10)

16 a) Write the steps to design FIR filter using Hamming window. (4)

   b) Obtain the Impulse response of the system defined by the difference equation y(n)-3y(n-1)-4y(n-2)=x(n)+2x(n-1) (6)

17 Explain the architecture of TMS320C3X floating point Digital Signal Processor with neat diagram. (10)

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Code No. 2147

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) II - Semester (Backlog) Examination, December 2019

Subject : Digital Communication

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 Distinguish between DM and ADM. 3
2 Define Quantization Error. What is its maximum value? 2
3 What is the need for companding? Explain. 2
4 Define the terms :
a) Hamming weight b) Hamming distance c) Minimum distance 3
5 Write the need for error control coding. 2
6 List out the properties of cyclic codes. 3
7 What do you understand by a correlation receiver? 3
8 Differentiate between coherent and non-coherent ASK. 2
9 Draw block diagram for the generation of FHSS signals. 2
10 What are the properties of PN sequence? 3

PART – B (50 Marks)

11 a) Explain working of a PCM system with a neat block diagram. 6
b) Derive the expression for the signal to quantization noise ratio and transmission B.W. of PCM system. 4

12 a) State and explain Huffman encoding theorem. 3
b) For the following messages with given probabilities, apply the Huffman coding procedure and find the efficiency and redundancy. 7

Xi	x_1	x_2	x_3	x_4	x_5	x_6
P(xi)	0.30	0.28	0.20	0.12	0.06	0.04

13 Consider a (7, 4) linear block code whose Generator matrix is : 10

$$G = \begin{bmatrix} 1 & 1 & 1 & 1 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 & 0 \\ 0 & 1 & 1 & 0 & 0 & 1 & 0 \\ 1 & 1 & 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

a) Find all the code words of the code
b) Find H, parity-check matrix of the code
c) Compute the Syndrome for the received vector 1 1 0 1 1 0 1. Is this a valid code vector?
d) What is the error-detection and error-correction capabilities of this code?

14 a) Define the following terms of a convolution encoder :
i) state diagram ii) tree diagram and iii) trellis diagram 4
b) Explain in detail the Viterbi algorithm with an example. 6

15 a) Explain with neat block diagrams, the modulator and demodulator of Binary Phase Shift Keying (BPSK). 5
b) Derive an expression for optimum filter design. 5

16 a) Explain in detail the process of Direct Sequence Spread Spectrum (DS-SS) modulation. 6
b) Compare Fast and Slow Frequency Hopping. 4

17 Write short notes on :
a) Need for MSK modulation 3
b) BCH code 3
c) Inter Symbol Interference (ISI) 4

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Code No. 2153

FACULTY OF ENGINEERING

B.E. 3/4 (M/P) II – Semester (Backlog) Examination, December 2019

Subject: Machine Design

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 factors should be considered for the design of springs?
2. What is nip and express its importance in leaf springs.
3. What is the use of crank shaft?
4. Sketch and mark the usual proportion of the cross-section of a connecting rod at mid-span.
5. How are gears classified?
6. What is a crown bevel gear?
7. What is Sommerfeld number?
8. What are the main components of rolling bearings?
9. What are the assumptions of a curved beam?
10. What kind of contact occurred between worm and wheel? How does this differ from other gears?

PART – B (50 Marks)

11. A composite spring has two closed coiled helical springs. The outer spring is 150mm larger than the inner springs. The inner spring has 8 coils of mean diameter 30 mm and wire diameter 4 mm. The outer spring has 10 coils of mean diameter 40 mm and wire diameter 5 mm. When the spring is subjected to an axial load of 400 N, find
    (a) Compression of each spring.
    (b) Load stress induced in each spring.
    The modulus of rigidity may be taken as 84 kN/mm^2.

12. A pair of worm and worm wheel is designated as 3/60/10/6. The worm is transmitting 5 kW at 1440 r.p.m. to worm wheel. The coefficient of friction is 0.1 and the normal pressure angle is 20^0. Determine the components of the gear tooth force acting on the worm and worm wheel.

13. A rolling contact bearing is mounted on a shaft whose speed is 720 r.p.m. The bearings are to have 99% reliability corresponding to a life of 24000 hrs. The bearing is subjected to an equivalent radial load of 1000 N. Determine basic dynamic load rating of the bearing at 90% of reliability.

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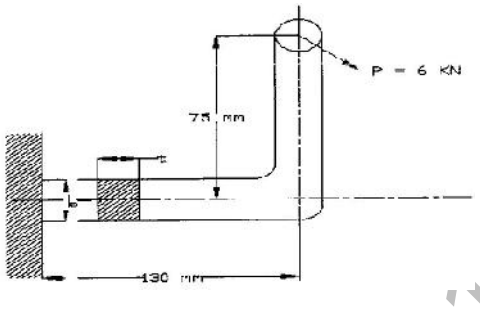
14. Describe the complete design procedure for Piston with neat sketch.

15. A bracket of rectangular cross section whose depth is twice the thickness is shown in the figure. It is subjected to load of 6 KN acting at 45^0 to the horizontal axis. Permissible stress in the material of bracket is limited to 60 MPa. Determine the dimensions of the bracket.



16. A helical cast steel gear with 30^0 helix angle has to transmit 35 kW at 1500 r.p.m. If the pinion has 24 teeth, determine the necessary module, pitch diameter and face width for 20^0 full depth teeth. The static stress for cast steel may be taken as 56Mpa. The width of face may be taken as 3 times the normal pitch. What would be the end thrust on the gear? The tooth factor for 20^0 full depth involute gears may be taken as $y = 0.154 - \frac{0.912}{T_E}$, where T_E represents the equivalent number of teeth.

17. A full journal bearing of 50 mm diameter and 100 mm length has a bearing pressure of 1.4 N/mm^2. The speed of the journal is 900 r.p.m. and the ratio of journal diameter to diametral clearance is 1000. The absolute viscosity of the oil at the operating temperature of 75^0C is 0.0111 Kg/m-sec. If the room temperature is 35^0C find the amount of artificial cooling required. Factor for end leakage is 0.002, Heat dissipation coefficient is $280W/m^2/^0C$.

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Code No. 2162

FACULTY OF ENGINEERING

B.E. 3/4 (AE) II - Semester (Backlog) Examination, December 2019

Subject : Design of Automotive Components

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 Mention the various considerations in the design of connecting rod.
2 What is interference angle between valve seating surface? Why it is provided?
3 Explain the classification of piston rings.
4 What is clash allowance in compression springs?
5 How are rolling contact bearings designated?
6 Differentiate hydro static and hydro dynamic lubrication.
7 Sketch the spur and bevel gears and show the forces and their analysis.
8 What is crowning in pulley's?
9 Define silent chain.
10 Define speed ratio of a gear drive.

PART – B (50 Marks)

11 The cylinder of a four stroke diesel engine has the following specifications : Brake power = 3kN, Speed = 800 rpm, indicated mean effective pressure = 0.3MPa, Mechanical efficiency = 80%, Determine the bore and length of the cylinder liner.

12 A safety value of 40mm diameter is to blow off at a pressure of 1.5 N/mm^2. It is held on its seat by a close coiled helical spring, with initial compression of 10mm. The maximum lift of the valve is 10mm. Design a suitable compression spring of spring index 6. The ultimate strength of the wire is 1200 MPa. The permissible shear stress is 600 MPa and G is 80 GPa. Calculate a) Diameter of the spring wire b) Mean coil diameter c) Number of active turns.

13 A semi elliptical truck spring has 12 leaves, of which two are full length leaves. The spring supports are 0.7 m apart the width of the central band is 80mm, and the load on the spring is 20kN. The permissible stress is 460 MPa. The ratio of the total depth to width of the spring is 3. Determine the thickness and width of the spring leaves. Also, determine the deflection of the spring. Assume that the extra full length leaf is not pre stressed. Take $E = 2.1 \times 10^5$ N/mm^2.

14 The following data is given for a 3600 Hydrodynamic bearing : radial load = 10kN, Journal speed = 1440 rpm, unit bearing pressure = 1000kPa, clearance ratio (r/c) = 800, viscosity of lubricant = 30 centi poise. Assuming the total heat generated in the bearing is carried by the total oil flow in the bearing. Calculate i) dimensions of the bearing ii) Coefficient of friction iii) Power lost in friction iv) Total flow of oil v) Temperature rise.

..2

15 A ball bearing subjected to a radial load of 3000 N is expected to have a satisfactory life of 10000 hours at 720 r.p.m. with a reliability of 95%. Calculate the dynamic load carrying capacity of the bearing, so that it can be selected from manufacturer's catalogue based on 90% reliability. If there are four such bearings each with a reliability of 95% in a system, what is the reliability of the complete system.

16 A pair of helical gears consist of a 20 teeth pinion meshing with a 100 teeth gear. The pinion rotates at 720 r.p.m. The normal pressure angle is 20^0 while the helix angle is 25^0. The face width is 40mm and the normal module is 4mm. The pinion as well as gear are made of steel having ultimate strength of 600 MPa and heat treated to a surface hardness of 300 B.H.N. The service factor and factor of safety are 1.5 and 2 respectively. Assume that the velocity factor accounts for the dynamic load and calculate the power transmitting capacity of the gears.

17 Write short note on :
   a) Ray-diagram of a gear box
   b) Speed reducers in gear box
   c) Preventive measures to avoid gear tooth failure

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Code No: 2167

FACULTY OF ENGINEERING

BE 3/4 (CSE) II Semester (Backlog) Examination, December 2019

Subject: Computer Networks

Time: 3 Hours **Max. Marks: 75**

Note: Answer All Questions From Part - A, & Any Five Questions From Part – B.

PART – A (25 MARKS)

1.	State the different approaches used for Congestion Control.	2
2.	Describe Count-to-Infinity Problem with an example.	3
3.	Describe the different types of routers used in OSPF.	3
4.	Define Address Resolution Protocol.	3
5.	List the 3 ways of Addressing in Transport Layer.	3
6	Define the Silly Window Syndrome.	2
7	Differentiate between SMTP, POP3 and IMAP.	3
8.	State the different HTTP Request methods.	2
9.	Describe Asynchronous I/0.	2
10.	Define Out-of-Band Data.	2

PART – B (50 MARKS)

11	a. Explain the TCP/IP reference Model and the functions of each layer.	5
	b. Compare Virtual-Circuit subnet and Datagram subnet.	5
12	a. Describe the purpose of the different ICMP Message types.	5
	b. Explain the fields of IPv4 Header with a neat diagram.	5
13	a. Describe the TCP Segment Header.	5
	b. Explain TCP timer Management.	5
14	a. Describe the SNMP protocol for network management.	5
	b. Explain the File Transfer Protocol.	5
15	a. With a neat diagram show the use of elementary socket system calls for TCP and UDP Communication.	7
	b. Explain the IPv4 Socket Address structure.	3
16	a. Explain Leaky Bucket algorithm for Traffic Shaping.	5
	b. Explain the different approaches for Broadcast Routing.	5
17	a. Explain Link State Packet Routing Algorithm with a suitable example.	5
	b. Describe DNS Resource Records.	5

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Code No: 2173

FACULTY OF ENGINEERING

BE 3 / 4 (I.T) II Semester (Backlog) Examination, December 2019

Subject: Computer Networks

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. Depict the relationship between a service and a protocol with a diagram. 2M
2. State the different approaches used for congestion control. 2M
3. List the parameters on which different networks can be differentiated. 3M
4. State the THREE different ways of Addressing used in Transport Layer. 3M
5. Describe any THREE Advanced System Calls. 3M
6. Define Byte Ordering and list the functions. 2M
7. State the function of RESOLVER in Domain Name System. 2M
8. Define the functions of any SIX built-in HTTP request methods. 3M
9. State the TWO Fundamental Cryptographic Principles. 2M
10. List the FOUR important properties of a Message Digest. 3M

PART – B (50 Marks)

11. a. Compare ISO-OSI and TCP/IP reference models. 5M
    b. Explain the Distance Vector Routing algorithm. 5M

12. a. Differentiate between Transparent and Non-Transparent Fragmentation. 4M
    b. Describe IPv4 Header with the help of diagram. 6M

13. a. Describe the socket system calls used in Connection-Oriented Communication with the help of a diagram. 5M
    b. Draw the flowchart showing the steps executed by the Internet Super Server. 5M

14. a. Describe the different DNS Resource Records types. 5M
    b. Describe the JPEG Standard for video compression. 5M

15. a. Explain RSA public key encryption algorithm. For **p=3, q=11** show how encryption of the plain text **HAI** is done? 5M
    b. Describe KERBEROS authentication protocol. 5M

16. a. Explain Token Bucket algorithm for Traffic Shaping. Calculate the **Burst length** given Burst Size is 9600KB, Maximum Output rate is 125 MB/sec and Token Arrival Rate is 25MB/sec. 6M
    b. Describe Address Resolution Protocol with a suitable example. 4M

17. a. Define Subnet Mask and its use. Compute the Maximum number of hosts a network can handle if it has a subnet mask of **255.255.240.0.** 4M
    b. Explain the Crash Recovery Protocol of Transport Layer. 6M

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Code No. 2889 / AICTE

FACULTY OF ENGINEERING

B.E. (CE / EE / Inst.) III – Semester (AICTE) (Main) Examination, December 2019

Subject: Energy Science & Engineering

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

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

PART – A (10x2 = 20 Marks)

1 What are the conventional and non-conventional energy sources?
2 What are the merits and demerits of Non-Conventional Energy resources?
3 How does a hydraulic turbine convert energy? What is water wheel?
4 Draw a neat sketch of impulse turbine.
5 What is biomass? How it is useful?
6 What are the difficulties in tidal power generation?
7 Explain the thermal energy storage method.
8 List the various waste heat recovery devices.
9 What are the environmental impacts of power generating stations?
10 What are the BEE standards?

PART – B (5x10 = 50 Marks)

11 Which type of non-conventional energy sources is the best suitable for rural and agricultural application and why? Explain in detail.

12 a) Draw the layout of hydroelectric power plant and explain the functions of each unit.
b) Discuss on pollution control and waste disposal in nuclear power stations.

13 a) Draw the schematic diagram of a flat plate solar collector and explain the working principle.
b) Explain the various methods of tidal power generation. What are the limitations of each method?

14 a) What are the advantages and disadvantages of Co-generation and Tri-generation?
b) Explain various mechanical energy storage devices with suitable sketches.

15 a) Briefly explain the methods adopted for estimation of power production.
b) List the various pollution standard methods used.

16 a) What are the methods adopted for converting wave energy into electrical energy?
b) Explain why the selection of suitable site is important in thermal power plants.

17 Answer any **three** of the following:
a) Statistics and prospects of conventional and renewable sources
b) Geothermal power plants
c) Electrical energy storage devices
d) Power plant economics.

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Code No.2903/AICTE

FACULTY OF ENGINEERING

B. E. (ECE)(AICTE) III – Semester (Main) Examination, December 2019

Subject: Electronic Devices

Time: 3 hours **Max. Marks: 70**

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

PART – A (20 Marks)

1. What is the effect of temperature on reverse saturation current of diode? A silicon diode has a saturation current of 15nA at a temperature of 100^0C. Calculate the reverse saturation current at 300^0C. 2
2. Distinguish between Zener breakdown and avalanche breakdown. 2
3. Draw the circuit diagram of Half wave rectifier and draw input and output waveforms. 2
4. What is Bleeder resistance? Explain the need for bleeder resistor. 2
5. Define alpha, beta and gamma. Give the relation between them. 2
6. Sketch the input and output characteristics of BJT in common emitter configuration. 2
7. Compare CB, CE and CC in terms of Current gain, Voltage gain, input resistance, output resistance, application and phase shift. 2
8. Draw the h-parameter model of BJT in CB configuration. 2
9. Prove that the transconductance gm of JFET is given by $g_m = \frac{2\sqrt{I_D I_{DSS}}}{V_p}$. 2
10. Define Pinch off Voltage. Sketch the depletion region before and after pinch off. 2

PART – B (50 Marks)

11. (a) Explain the formation and working of PN junction diode in forward and reverse bias with neat diagrams. Draw its V-I characteristics. 5
    (b) Derive the expression for transition capacitance. 5
12. (a) Derive the expression of ripple factor for Half wave rectifier with capacitor filter. 6
    (b) Design a Half wave rectifier with capacitor filter to provide dc output with 2% ripple for a 100Ω load. 4
13. (a) Derive the stability factor of a Self bias circuit. 5
    (b) Explain how h-parameters are obtained graphically. 5
14. For the transistor amplifier shown in figure below, calculate A_I, A_V, R_I, R_O using exact and approximate analysis. Use h_{fe}=50, h_{ie}=1.1kΩ, h_{re}=250μ, h_{oe}=25μA / V. 10

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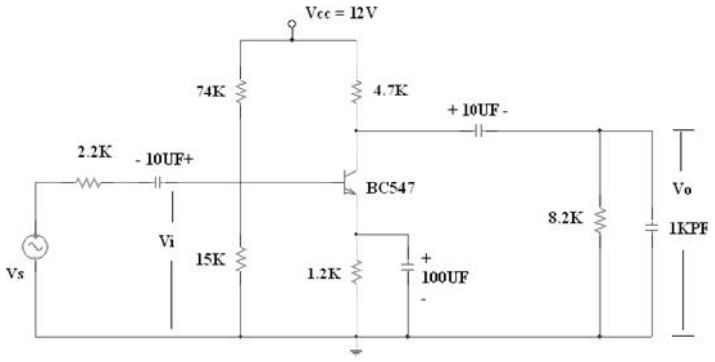

15. (a) Draw the structure of N-channel JFET. Explain the transfer and drain characteristics with neat diagrams. 7

    (b) A JFET has drain saturation current I_{DSS} of 12mA and I_D of 6mA with a pinch off voltage of -4Volts. Calculate V_{GS} and gm. 3

16. (a) Draw the circuit of CE amplifier using diode compensation for Ico. Describe how bias compensation in achieved. 5

    (b) What is Early Effect? What are its consequences? 5

17. Write short notes on:

    (a) Photo diode. 5

    (b) Fabrication Process. 5

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Code No.2905/AICTE

FACULTY OF ENGINEERING

B. E. (M/P/AE/CSE/IT) (AICTE) III–Semester (Main) Examination, December 2019

Subject: Basic Electronics

Time: 3 hours **Max. Marks: 70**

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

PART – A (20 Marks)

1. How N-type and P-type semi-conductors are formed. 2
2. List the applications of Cathode Ray oscilloscope. 2
3. Draw symbols of NPN & PNP transistors. What does the arrow in it indicates? 2
4. Mention advantages of JFET over BJT. 2
5. List out the advantages of negative feedback amplifier. 2
6. Define the terms CMRR and slew rate of an op-amp. 2
7. Give the truth table of Half substractor. 2
8. Define guage factor for a strain guage. 2
9. Explain Barkhausen criterion. 2
10. Draw the circuit diagram of an R-2R ladder type digital to Analog converter. 2

PART – B (50 Marks)

11. (a) Explain V-I characteristics of ρ-n junction diode. Discuss the temperature dependence of ρ-n characteristics. 7
    (b) What is Zener diode? 3
12. (a) Draw a neat sketch of an CLC filter and explain. 5
    (b) How does Zener diode act as regulator? Explain. 5
13. (a) Explain the working of JFET and also describe the drain and transfer characteristics. 5
    (b) Explain input and output characteristics of CB configuration. 5
14. (a) Draw the block diagram of a feedback amplifier and explain the functioning of each block. 4
    (b) Describe the working of colpitts oscillator, derive the equation for frequency of oscillations and also derive the condition for sustained oscillations. 6
15. List and explain AC and Dc characteristics of an op-amp. 10
16. (a) With neat block diagram, describe the working of CRO. 5
    (b) Give the truth table of Half adder and realize half adder using NAND gates. 5
17. Write short notes on
    (a) h-parameter model of BJT 4
    (b) Successive approximation ADC. 3
    (c) Integrator by using an op-amp. 3

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