Code No. 425 / A / CBCS

FACULTY OF ENGINEERING

B.E. (Civil) III – Semester (CBCS) (Supple.) Examination, May / June 2018

Subject: Electrical Technology (Part – A)

Time:1 ½ Hours **Max.Marks: 38**

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

PART – A (14 Marks)

1 Define form factor and peak factor. 2

2 List out the advantages of three phase systems. 2

3 Explain the working principle three phase induction motor. 3

4 Classify DC machines. 2

5 Draw the torque slip characteristics of three-phase induction motor. 3

6 List out the applications of single-phase induction motor. 2

PART – B (24 Marks)

7 a) A series circuit has R = 100 ohms, L = 25 mH, and C = 100 μF and is supplied with 230 V, 50 Hz. Find:
   i) Impedance
   ii) Current
   iii) Power
   iv) Power factor
   v) Voltage drop across the each element. 4

   b) State the Kirchhoff's voltage law and current law with suitable examples. 4

8 a) With neat diagram explain the working principle of single phase energy meter. 4

   b) Derive the relation between the line voltage and phase voltage, line current and phase current for delta connected three phase system. 4

9 Obtain the equivalent circuit of a 220 / 440 V, 50 Hz, 1-phase transformer from the following test data:
O.C test: 220 V, 0.75 A, 90 W – on L.V. side
S.C test: 20 V, 12 A 65 W – on H.V. side
Calculate the secondary voltage when delivering 5 kW at 0.8 p.f. lagging the primary voltage being 230V. 8

10 a) With necessary diagram explain in detail about the single phase capacitor start motor. 4

   b) Derive emf equation of a single phase transformer. 4

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CODE NO: 425/B/CBCS

FACULTY OF ENGINEERING

B.E (Civil) III-Semester (CBCS) (Supple.) Examination, May / June 2018

Sub: Mechanical Technology (Part-B)

TIME: 1 ½ Hours **Max. Marks: 37**

Note: Answer All Questions from Part – A and Any three Questions From Part–B.

PART–A (13Marks)

1. What are paving breaker, Pneumatic jack hammer and Rock drill 3
2. Differentiate Earth moving and Excavating equipments 3
3. Differentiate between Screw conveyor and Belt conveyor 2
4. Define Gyrating crusher 2
5. Where Paving breaker is used? 3

PART–B (3x8=24Marks)

6. a) Explain Shovels and Draglines. 4
   b) Differentiate Bulldozers and Earth compactors. 4

7. a) List different applications of Screw conveyor and Apron conveyor. 4
   b) List out the advantages and disadvantages of Hoist winch and differential and Worm geared chain hoists. 4

8. a) With a neat sketch, bring out the applications of Construction elevator and Bucket Elevator. 5
   b) Briefly bring out the use of Whirler 3

9. a) With a neat sketch, describe shaking and Vibrating screens and their applications 5
   b) How Concrete pumps are different from any other conventional pumps? 3

10. Explain Multistage reciprocating air compressor with a neat sketch. 8

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Code No: 438/CBCS

FACULTY OF ENGINEERING

B.E. (ECE) III Semester (CBCS) (Supple.) Examination, May / June 2018

Subject: Elements of Mechanical Engineering

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

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

PART – A (10x2=20Marks)

1. Write the limitations of the law of thermodynamics.
2. A Carnot refrigerator operating between -10^{o}C and 45^{o}C determine COP.
3. In an air compressor the initial pressure+1 bar, Temperature=25^{o}C, Pressure ratio=4.24 and ¥ =1.4, Determine the work done required per kg of air compressed. Take R of air=.287Kj/Kg K.
4. Compare two stroke engines with four stroke engines (Write any four points).
5. Explain the Fourier's law of conduction.
6. In a Parallel flow heat exchanger the cold water inlet temperature=25^{o}C, out let temperature=48^{o}C and Hot water inlet temperature=65^{o}C and outlet temperature=32^{o}C. Determine its LMTD.
7. Sketch compound belt drive and write its applications.
8. In a gear drive the gear has 96 teeth and a circular pitch of 48mm. Determine diametral pitch and Pitch circle diameter.
9. List the operations carried out on a Lathe machine.
10. Ketch any two forming processes and write their applications.

PART – B (5x10=50 Marks)

11. (a) A heat engine is supplied with 2500kJ/min of heat 600^{o}C. Heat rejection takes place at 100^{o}C. Specify which of the following heat rejections represent reversible, irreversible and impossible. I) 850kJ/min ii)1050kJ/min. iii)1450kJ/kg.
    (b) Explain Kelvin Plank and Clausius statement.

12. (a) Describe the working of a single stage reciprocating air compressor with a sketch.
    (b) In a single cylinder four stroke petrol engine test rig the Bore=100 mm and stroke=150mm speed=1200rpm mean effective pressure=6.25 bar and mechanical efficiency=85%. Determine its I.P. and B.P. and also sketch the working cycle on P-v and T-s plane.

13. (a) Determine the steady state heat transfer per unit area through a 4 cm thick homogeneous slab with its two faces maintained at uniform temperatures of 300 ^{o}C and 125^{o}C. The thermal conductivity of wall material is 0.2.0x10^{-4} kW/m-deg.
    (b) Explain the Newton's law of cooling and compare forced convective heat transfer with natural convective heat transfer.

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Code No: 438/CBCS

14. (a) Write the classification of gear trains and explain the working Reverted gear train.
    (b) A Pulley 300 mm diameter is driven at 550 rpm by a belt having thickness of 10mm. The tensions on the tight side and slack side are 2000N and 600N respectively. Find the power transmitted by the drive.

15. (a) Explain the working principle and applications of Oxy-Acetylene welding with a sketch.
    (b) Describe the working of USM with a sketch and mention its applications.

16. (a) Describe the working four stroke petrol engine with a sketch.
    (b) Derive the expression for the LMTD of parallel flow heat exchanger.

17. (a) Compare gear drives with belt drives.
    (b) List various operations carried out on a Lathe machine grinding machine.

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Code No: 443/CBCS

FACULTY OF ENGINEERING

B.E. III Semester (CBCS)(M/P/AE)(Supple.) Examination, May / June 2018

Subject: Mechanics of Materials

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

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

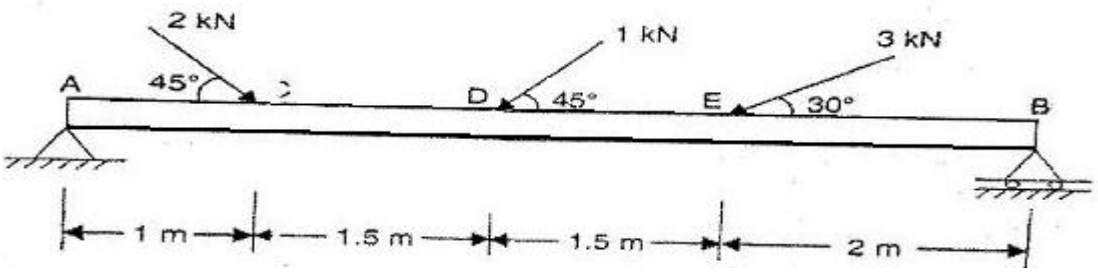
PART – A (10x2=20Marks)

1 Define the following terms
   a) young's Modulus b) modulus of rigidity
2 The safe stress for a hollow steel column which carries and axial load of $2.1x10^3$ KN is $125MN/m^3$. If the external diameter of the column is 30cm, determine the internal diameter.
3 What are the various types beams with neat sketch
4 Define Point of contraflexure.
5 What do you mean by section modulus.
6 What do you mean by "simple bending" or "pure bending"?
7 Define resilience and proof resilience.
8 A tensile load of 60KN is gradually applied to a circular bar of 4 cm diameter and 5cm long. If young's modulus is $2x10^5$ N/mm^2. Calculate strain energy absorbed by the rod.
9 Define torsion and polar moment of inertia.
10 Define spring. What are the various types of springs explain clearly with neat sketch.

PART – B (5x10=50 Marks)

11 A steel tube of 30mm external diameter and 20mm internal diameter encloses a copper rod of 15mm diameter to which it is rigidly join at each end. If at a temperature of 10^0 there is no longitudinal stress, calculate the stresses in the rod and tube when the temperature is raised to 200^0C take E for steel and copper as $2.1x10^5$ N/mm2 and $1x10^5$N/mm^2 respectively. The value of co-efficient of linear expansion for steel and copper is given as $11x10^{-6}$ per ^{o}C and $18x10^{-6}$per ^{o}C respectively.

12 A beam is loaded as shown in below fig. Find the reactions at A and B, and also draw shear force and bending moment diagrams.



13. A point in a strained is subjected to stresses as shown in below figure. Using Mohr's circle method, determine the normal, tangential and resultant stress across the oblique plane.

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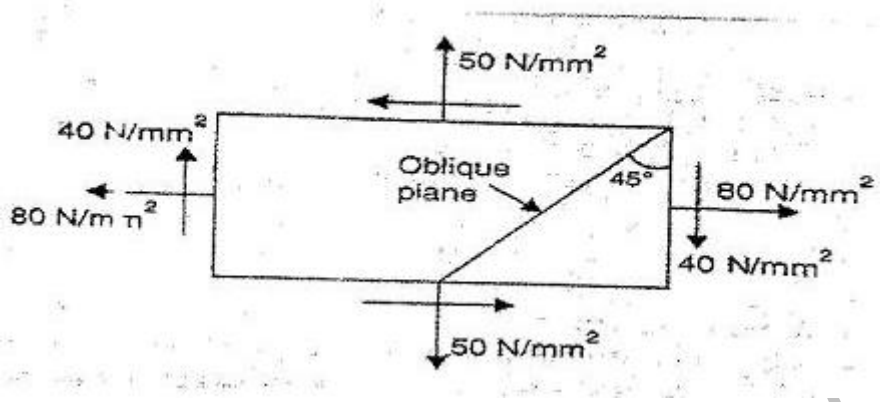
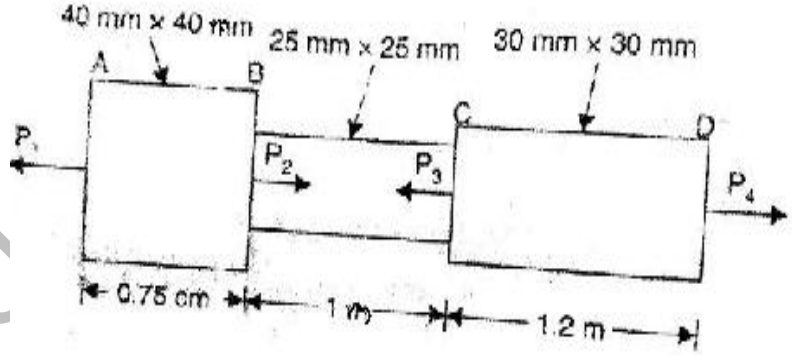


14. Prove that the deflection at the centre of a simply supported beam, carrying a point load at the centre is given by

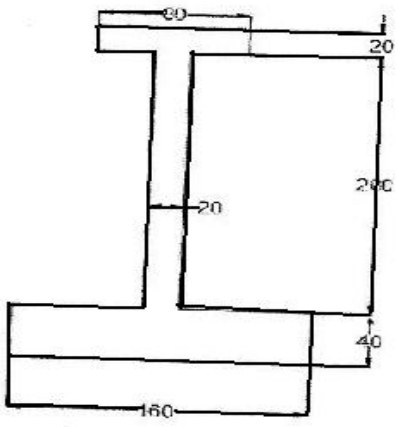
$$Yc = \frac{WL^3}{48EI}$$

15. A hollow shaft is to transmit 300KW power at 80r.p.m if the shear is not a exceed 60M/mm^2 and the internal diameter is 0.6 of the external diameter, find the external and internal diameters assuming that the maximum torque is 1.4 times of the mean torque.

16. A member ABCD is subjected to point P_1, P_2, P_3 and P_4, as shown in below fig. Calculate the force P_3 necessary for equilibrium if P_1=120KN, P_2=220 and P_4=160KN. Determine also the net change in the length of the member. Take E=Take E=200000MN/m^2.



17. A cast iron beam is of I-section as shown in figure. The beam is simply supported on a span of 5 meters. If the tensile stress is not to exceed 20 N/mm^2, find the uniformly load which the beam can carry. Find also the maximum compressive stress.



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Code No. 451/CBCS

FACULTY OF ENGINEERING

B.E III-Semester (CBCS) (CSE) (Supple.) Examination, May / June 2018
Subject : Basic Electronics

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

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

Part - A (20 Marks)

1. Define conductivity. (2)
2. What is Hall effect? Mention applications of it? (2)
3. What is operating point? (2)
4. Draw small signal model BJT. (2)
5. What is Barkhausen Criteria? (2)
6. Draw the equivalent ckt of crystal. (2)
7. What are the ideal characteristics of op-amp? (2)
8. Give truth table of half adder. (2)
9. Define gauge factor. (2)
10. Draw the symbol of SCR. (2)

Part - B (50 Marks)

11. Explain full wave bridge rectifier with its wave forms? Derive (i) RMS voltage (ii) PIV (iii) TUF (iv) Regulation. (10)
12. a) Explain the working of n-p-n transistor with its current components? (5)
    b) Derive A_v, A_i, Z_i, Z_o of CS amplifier. (5)
13 Explain RC phase shift oscillator? Derive its frequency of oscillation (10)
14. a) Explain Instrumentation amplifier? (5)
    b) Give full adder ckt and its truth table. (5)
15. a) Explain the working of LVDT? (5)
    b) Explain the construction and working of CRO? (5)
16. a) Explain how Zener diode works as a regulator with its ckt. (5)
    b) Explain how transistor works as amplifier. (5)
17. a) Derive the general equation of LC oscillator. (5)
    b) Explain working of UJT. (5)

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Code No. 431/CBCS

FACULTY OF ENGINEERING

B.E III – Semester (CBCS) (EE / Inst.) (Supple.) Examination, May / June, 2018
Subject :Electronic Engineering - II

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

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

Part – A (20 MARKS)

1. Write about classification of Amplifier. (2)
2. What are interacting and non-interacting stages? (2)
3. Draw the circuit of basic trans conductance amplifier and mention its ideal input & output impedance values. (2)
4. What are the advantages of negative feed back . (2)
5. Find the operating frequency of a Colpitt's oscillator if C1=50 pF,C2=30pF and L=50 mH.
6. State the Barkhaunsen's criterion for sustained oscillations. (2)
7. Explain Cross over distortion in complimentary Symmetry Push -Pull power amplifiers. (2)
8. Define class-A, B, AB and C operations of a power amplifier.
9. State the Clamping Theorem. (2)
10. Draw Low pass RC circuit and prove output voltage is integral of input voltage. (2)

PART – B (50 Marks)

11. (a) Derive expressions for voltage gain at mid and high frequency of a style stage RC coupled BJT amplifier. (7)
    (b) Write about step response of amplifier. (3)

12. (a) Draw the voltage series feedback amplifier block diagram and derive voltage gain A_{Vf} , Input impedance R_{if} and output impedance R_{of}. (6)
    (b) An amplifier has open loop voltage gain of 1000±100. If 10% of negative feedback is introduced. What is the closed loop voltage gain and its variation? (4)

13. Draw the Hartley oscillator circuit and explain its principle of operation and derive its operating frequency. (10)
14. (a) Draw a Crystal Oscillator circuit and explain. (4)
    (b) Draw and explain RC coupled amplifier for cascading (6)

15. (a) Draw a series fed class A power amplifier and derive its theoretical Efficiency (5)
    (b) A power transistor operated in class A delivers a maximum of 8W to a 10Ω load with supply voltage of 22 V .Calculate (5)
    i) Peak collector current (ii) Efficiency (iii) Step down turns Ratio.
16. (a)What is the condition a RC high pass circuit to act as differentiator and explain how it behaves for a square wave input.
    (b) Define clippers and clampers. Explain any one application w.r.t. clamper (5)

17. Write short notes on the following. (10)
    (a) Frequency Stability in Oscillators
    (b) Local versus Global feedback
    (b) Mid frequency analysis of a RC coupled amplifier

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CODE NO: 459/CBCS

FACULTY OF INFORMATICS

BE III Semester (CBCS) (I.T) (supple.) EXAMINATION, May/June 2018

Subject: Probability & 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. If A and B are independent events , prove that their complementary events are also independent.
2. If S={1,2,3,4} , obtain the smallest field that contains the sets {1} and {2,3}
3. Determine the characteristic function of Poisson distribution
4. Suppose that the amount of waiting time a customer spends at a restaurant has an exponential distribution with a mean value of 5 minutes. Determine the probability that a customer will spend more than 10 minutes in the restaurant.
5. If two random variables X and Y are independent then prove that E(Y|X)=E(Y).
6. Given $Z = \frac{X}{Y}$ Determine the density f(z) of Z.
7. Define mean and correlation of ergodic process.
8. If {X(t)} is a wide-sense stationary process with ACF $R(r) = Ae^{-\alpha|r|}$. Determine the second order moment of the RV [X(8) – X(5)].
9. List any four properties of power spectral density.
10. Draw the low-pass and band-pass representation of white noise.

Part – B (50 Marks)

11. (a) State and prove Baye's theorem.
    (b) A pair of dice is rolled on every play and player wins at once if the total for the first throw is 7 or 11, loses at once if 2,3 or 12 are rolled. Any other throw is called a "carry- over." If the first throw is a carry-over, then the player throws the dice repeatedly until he wins by throwing the same carry-over again , or loses by throwing 7. What is the probability of winning the game ? (7M)

12. (a) A fair coin is tossed 900 times. What is the probability that the number of heads is between 420 and 465? (5M)

    (b) Given the RV 'X' with the density function f(x) = 2x for $0<x<1$
    = 0 else where
    Determine the pdf of $Y=8X^3$ (5M)

contd…2

13. (a) Let X and Y be independent exponential random variables with common parameter λ. Define U = X+Y and V=X-Y. Find the joint density of U and V. (5M)

    (b) Given two RVs with the joint pdf $f(x,y) = kxye^{-(x^2+y^2)}$ x>0, y>0.
    Find i) Value of k ii) Show that X and Y are independent. (5M)

14. (a) State the properties of cross correlation function. (3M)

    (b) If U(t) = X cos t + Y sin t. and V(t) = Y cos t + X sin t, where X and Y are independent RVs such that E(X) = E(Y) = 0, $E(X^2) = E(Y^2) = 1$. Prove that {U(t)} and {V(t)} are individually WSS processes. (7M)

15. (a) Determine the power spectral density of a random process whose ACF is given by $R(\tau) = e^{-\alpha\tau^2}$ (5M)

    (b) Describe Gaussian random process. (5M)

16. (a) A fair coin is tossed 3 times and if X represents the number of heads appeared. Find the distribution of X. (4M)

    (b) The process X(t) is a WSS and normal with E{X(t)} =0 and $R(\tau) = 4e^{-2|\tau|}$.
    Determine i. $P\{X(t) \leq 3\}$ ii. $E\{[X(t+1) - X(t-1)]^2\}$ (6M)

17. (a) The random variables X and Y are independent and Y is uniform in the interval (0,1). Show that if Z = X + Y, then $f_z(z) = F_x(z) - F_x(z-1)$ (6M)

    (b) A pair of dice is rolled n times.
    i) Find the probability that "seven" will not shown at all.
    ii) Find the probability of obtaining double six at least once. (4M)

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