Code No. 2920/AICTE

FACULTY OF ENGINEERING

B.E. IV – Semester (AICTE) (CE/EE/Inst.) (Main) Examination, December 2020

Subject: Elements of Mechanical Engineering

Time : 2 hours **Max. Marks : 70**

Note: (Missing data if, any can be assumed suitable)

PART – A

Note: Answer any five questions. **(5 x 2 = 10 Marks)**

1. Distinguish between S.I and C.I engine.
2. Draw neat sketch of valve timing diagram for four stoke petrol engine.
3. Explain Newton's law of cooling.
4. Write classification of heat exchangers.
5. Write the classification of Hydraulic Turbines.
6. Define slip and creep.
7. Differentiate between simple and compound gear trains.
8. Write classification of Gears.
9. Write the applications of additive manufacturing.
10. List the different parts of Lathe machine.

PART – B

Answer any four questions. **(4 x 15 = 60 Marks)**

11. (a) With neat sketches explain four stroke petrol engine.
    (b) Explain with neat sketch closed cycle gas turbine.

12. (a) Water is heated in a double pipe heat exchanger from 50°C to 220°C by hot gases that cools from 450°C to 150°C. Determine the LMTD. Show the variation of temperature along the length of heat exchanger and name the heat exchanger.
    (b) Explain Fourier's law.

13. (a) Explain Pelton wheel with neat sketch.
    (b) Explain working principle of centrifugal pump.

14. (a) Derive an expression for length of open belt drive.
    (b) Explain with neat sketch reverted gear train.

15. (a) Differentiate between welding, brazing and soldering.
    (b) Explain with neat sketch compound gear train.

16. (a) Derive an expression of LMTD of parallel flow heat exchanger.
    (b) State and explain Stefan Boltzmann law.

17. Write note on any two of the following.
    (a) Open cycle gas turbine
    (b) Types of flames used in gas welding
    (c) Reverted gear train.

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Code. No. 2932/AICTE

FACULTY OF ENGINEERING

B.E. (ECE/CSE/IT) (AICTE) IV-Semester (Main) Examination, December 2020

Subject : Signals and Systems

Time : 2 Hours **Max. Marks : 70**

Note: (Missing data if, any can be assumed suitable)

PART – A

Answer any five questions. **(5 x 2 = 10 Marks)**

1. Define unit step, ramp and delta functions for Continuous Time signal.
2. Check whether the signal x(t) = $e^{j10\Pi t}$ is periodic or not, if periodic find the periodicity.
3. Define exponential Fourier series.
4. Briefly explain Dirichlet's conditions.
5. Find the Fourier transform of a signal x(t) =e^{5t} u(-t).
6. Find the Laplace transform of x(t)=tu(-t).
7. Define power and energy signals.
8. Find the linear convolution of X(n)= {2,4,3, -6} with h(n)= {3,7,-1,3}.
9. Find the transfer function for the given difference equation y(n)=0.5y(n-1)-3y (n-2) +2x(n)
10. Differentiate Laplace and Z Transform?

PART – B

Answer any four questions. **(4 x 15 = 60 Marks)**

11. a) Find whether the given x(t) is energy signal or power signal and also find the energy and power of the signal

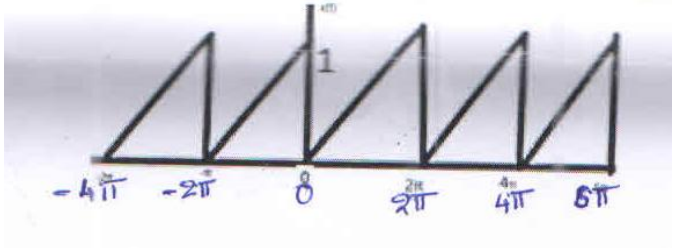
$$x(t) = t-2 \; ; \quad -2 \le t \le 0$$
$$= 2-t \; ; \quad 0 \le t \le 2$$
$$= 0 \; ; \quad \text{otherwise}$$

b) Find the even and odd components of the signal x(t)=5+3t+$6t^2$+$7t^3$

12. a) Check whether the system y(t)=2x(t)+x(t/2) is LTI system or not
b) Check whether the system y(t)=(t+10)u(t) is stable or unstable

13. a) Show that the functions sinnw_0t and cosmw_0t are orthogonal over any interval $\{t_o, t_o + 2\pi/w_o\}$ for integer values of n and m
b) Find the convolution of two signals $x_1(t)=e^{-2t}u(t)$, $x_2(t)=e^{-3t}u(t)$ using graphical method.

14. a) Obtain the exponential Fourier series of for the below waveform x(t)



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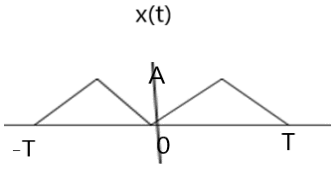
b) Determine the Trigonometric Fourier series coefficients of the function shown below



for the interval (0, T) with amplitude of 'A'

15. a) State and prove any four properties of Fourier transform.
    b) Find the Fourier transform of sgn(t).

16. a) Find the DFS of x(n)={2,4,5,7,2,3}.
    b) Explain with examples any three operations on discrete time signals.

17. a) Find the z-Transform of $n\left[\frac{1}{2}\right]^n$ u(n)*$\left[\frac{1}{3}\right]^n$ u(n)
    b) Find the inverse z transform of $\frac{Z^{-1}}{3-4Z^{-1}+Z^{-2}}$

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Code No. 2937/AICTE

FACULTY OF ENGINEERING

B.E IV-Semester (AICTE) (M/P/AE) (Main) Examination, December 2020

Subject : Energy Sciences and Engineering

Time: 2 Hours **Max. Marks: 70**

Note: (Missing data if, any can be assumed suitable)

PART – A

Answer any five questions. **(5 x 2 = 10 Marks)**

1 What are conventional energy sources?
2 List the different sources of energy.
3 Write short notes on fossil fuels.
4 Explain about surge tank.
5 What are limitations of OTEC power plant?
6 What are the main parts of wind turbine?
7 What is meant by Tri-generation?
8 What are various heat recovery units?
9 List the various pollution control methods.
10 What is the BEE.

PART – B

Answer any four questions. **(4 x 15 = 60 Marks)**

11 a) Write the advantages and disadvantages of renewable energy sources
b) What are the prospects of nonconventional energy sources in India? Explain.

12 a) Draw a typical layout of hydroelectric power plant and explain its working Principle.
b) Describe the radioactive waste disposal methods.

13 a) Differentiate wave energy and tidal energy systems.
b) With a neat sketch, explain the working of Indian type biogas plant.

14 a) Explain three basic methods of thermal energy storage.
b) How will you go about developing a waste heat recovery system.

15 a) Explain the economics in plant selection.
b) Explain the various pollution standard methods used.

16 a) Explain the working principle of OTEC closed cycle system.
b) With a neat sketch, explain the working of nuclear reactor and its parts.

17 a) Discuss about the methods to store chemical energy.
b) How the cost of power generation can be controlled.

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