Code No. 11171 / S

FACULTY OF ENGINEERING

B.E. 4/4 (Civil) I-Semester (Main & Backlog) (Suppl.) Examination,

April / May 2019

Subject : Structural Engineering Design and Detailing – II (Steel)

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

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

PART – A (25 Marks)

1 A simply supported beam carrying UDL load throughout the span of length (i), Calculate collapse load condition. 2

2 Under What conditions vertical intermediate stiffness are provided. Write permissible effected area value lengths. 3

3 What is outstanding width and also write classification of section formulas for rolled section. 2

4 Describe the failure conditions for the Plate Girder (I section) with a neat sketch. 3

5 Explain the conditions to be considered for finding the maximum shear force in the design of a Gantry-Girder. 2

6 Explain the type of loads generated by Gantry Wheel with a neat sketch. 3

7 Draw the Neat sketch of rocker cum Roller Bearing. 2

8 What are the failure conditions of a Deck-Type Plate Girder and how is it resisted by providing safety factors. 3

9 Explain Fullers and Waddell's formulae for estimating self-weight of Plate Girder. 2

10 Explain flange curtailments with a sketch for a Deck-Type Plate Girder. 3

PART – B (50 Marks)

11 Design a simply supported welded plate girder 26m span and laterally restrained throughout. It has to support an UDL of 120 KN/m, throughout the span exclusive self-weight. Design the cross section of the girder without intermediate stiffness (Limit State Design). Design up to end bearing stiffeners with welded connection of flange and web.

OR

12 A welded plate girder is to be designed, effective span 24m. It carries 100KN/m live load over entire span, including self-weight. Design intermediate stiffeners (End-Bearing Stiffeners design isn't required).

13 Design a simply-supported gantry girder to carry one Electric Overhead Travelling (EOT) crane :

- C/C span of gantry girder = 7 m
- Span of crane girders = 18 m
- Crane capacity = 200 kN
- Self weight of crane girder = 180 kN
- Self weight of trolley = 40 kN
- Distance between 2 wheels = 3 m
- Minimum hook approach = 1.2 m
- Self weight of Rails = 0.3 kN/m

OR

..2

14 The effective span of a Plate Girder through type bridge for a single B.G. Track is 30m. The reaction due to (D..L.+L.L. + I.L.) is 1000KN. The vertical reaction due to overturning effect of wind at each end of the Girder is 80KN, lateral load due to wind at each bearing is 34KN, compressed strength of concrete is 7 N/mm^2, design the Rocker Bearing.

15 Design a Deck type Plate Girder Bridge for a single track B.G. Main line loading for the following data.

- Effective span of the bridge = 30 m
- Spacing of Plate Girders = 2m (C/C)
- EUDL-B.M. = 2800 KN : EUDL-S.F. = 3023 KN

Design the stiffeners and connections, also draw neat sketches of design details.

OR

16 A through type Pratt-Truss Birder Bridge on a B.G.Main line, single track has a span of 40m. Find the forces and design in any one top chord member and one Web Member due to D.L, L.L and impact load. (Sway bracings and Portal Bracing's effects needn't be considered), length of each panel is 4m.

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Code No. 11182

FACULTY OF ENGINEERING

B.E. 4/4 (EEE) I-Semester (Suppl.) Examination, April / May 2019

Subject : Power System Operation and Controller

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. Write the differences between modeling of a simple electric circuit and inter connected power system network 3
2. An inter connected power system network consists of 12 number of load buses, 5 no. of generator buses, write the power flow equations used for N-R Rectangular Load flow solution technique. 2
3. For what major changes it is required to recalculate loss co – efficient of a power system network 2
4. Distinguish between static reserve and spinning reserve of a thermal power plant 3
5. Draw the steady state load frequency characteristics of a typical speed governor system of a thermal power plant. 2
6. Mention the typical values of time constants of (i) speed governor (ii) steam turbine (iii) generator and (iv) regulation constant of speed governor. Justify your answer. 3
7. What is the out come of angle stability study of a power system network? 2
8. Shall we use Swing equation to obtain steady state stability limit of a power system? Justify your answer 3
9. Write the comparison between STATCOM and SVC. 2
10. Draw the circuit diagram of TSC (Thyristor Switched Capacitor) 3

PART – B (5x10 = 50 Marks)

11 For the system shown in Fig.1 find the voltage at the receiving bus at the end of the first iteration Load is 2+jo.8 pu. Voltage at the sending end (slack) is 1+jo p.u Line admittance is 1.0-j4.0 pu. Transformer reactance is jo.4 pu. Off nominal turns ratio is 1/1.04. Use the G.S technique. Assume $V_R = 1\angle 0^o$. 10

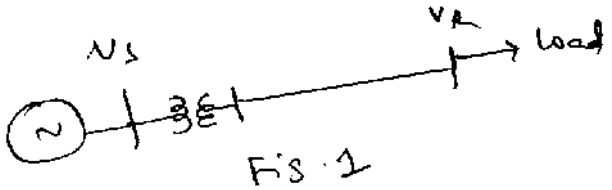

Fig. 1

12 a) Fig.2 Shows the incremental fuel cost curves of generator A and B How would a load (i) more than 3 P_G (ii) equal to 2 P_G and (iii) less than $2P_G$ be shared between A and B if both generators are running 5

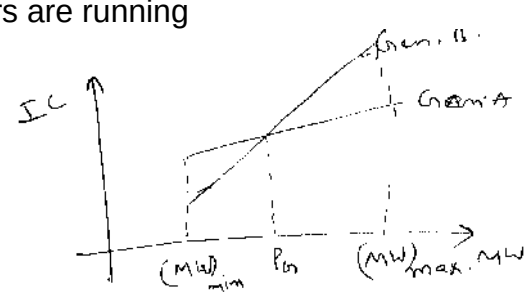

Fig. 2

b) Derive the exact co ordination equation 5

13 a) Draw a neat schematic diagram of load frequency and excitation Voltage regulators of a turbo- generator write the function of each component 5

b) Two generators rated 220MW and 430 MW are operating in parallel. The droop characteristics of their governors are 4% and 5%, respectively from no load to full load. Assuming that the generators are operating at 50 Hz at no – load. How would be a load of 650 MW shared between them? 5

14 A 20 MVA, 50 Hz generator delivers 18MW over a double circuit line to an infinite bus. The generator has kinetic energy of 2.52 MJ.MVA at rated speed. The generator transient reactance is X'_d=0.35 pu Each transmission circuit has r=o and a reactance of 0.2 pu on a 20 MVA base. $|E^1|$ = 1.1pu and infinite bus Voltage v=1.0$\angle 0^o$. A Three phase short circuit occurs at the mid point of the transmission line. Plot swing curves with fault cleared by simultaneous opening of breakers at both ends of the line at 2.5 cycles and 6.25 cycles after the occurrence of fault 10

15 a) With a neat block diagram explain the principle of operation of UPFC 5

b) With a neat block diagram explain the principle of operation of automatic voltage regulator 5

16 a) Draw the flow chart to solve the static load flow solutions using fast decoupled method 5

b) Draw (i) heat rate curve (ii)Input-out-put curve and (iii) incremental cost curve of a themal generator. 5

17 Write short notes on 10

a) Swing Equation

b) Modeling of Two area control

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Code No: 11194/S

FACULTY OF ENGINEERING

BE 4/4 (Inst.) I-Semester (Suppl.) Examination, April / May 2019

Subject : Analytical Instrumentation

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

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

PART-A (25 Marks)

1. What are basic components of an Analytical Instrument? 2
2. What are the various regions of EMR Spectrum? 3
3. List out the various types of Mass Spectrometers 2
4. Write the Principle involved in NMR 3
5. Explain about Amino Acid Analyzer. 3
6. Describe Dropping Mercury Electrode 2
7. Define Half Wave Potential 2
8. What is Selective Ion Electrode? Give example 3
9. Explain about SO_2 in air is monitored by conductimetric method 3
10. Explain Analyzers based on gas density 2

PART-B (5x10=50 Marks)

11. a) With the help of the Mathematical equation explain Beer Lambert Law *5*
b) Explain Double beam Spectrophotometer with neat diagram 5

12 a) With a neat diagram explain Magnetic Deflection Mass Spectrometer 5
b) What are the essential components of Infrared Spectrophotometers? Explain each of them in detail. 5

13 a) With the help of neat diagram explain the Principle of Liquid Chjromatography 5
b) Explain the different types of Nuclear Magnetic Resonance Spectrometers 5

14 a) Explain the operation of PH Meter with relevant diagram 5
b) What are the different types of Air Pollution Monitoring Instruments? 5

15 a) Explain how Oxygen can be identified by Magnetic Wind Instrument 5
b) What are the different types of Air Pollution Monitoring Instruments? 5

16 a) Explain the working of Absorption Instrument 5
b) With a neat diagram explain Thermal Conductivity Analyzer 5

17 Write a short note on the following
a) Chemically Sensitive Semiconductor devices 5
b) Sample Handling Techniques 5

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Code No. 11197/S

FACULTY OF ENGINEERING

BE 4/4 (ECE) I-semester (Main & Backlog) (Suppl.) Examination, April / May 2019

Subject: Microwave Engineering

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

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

PART-A (25 Marks)

1. What is cut off frequency or critical frequency (fc)? (2)
2. What are degenerate modes in a rectangular waveguide? (2)
3. Derive the expression for phase velocity in a rectangular waveguide & sketch the variation with frequency. (3)
4. Define Quality factor (Q) of a resonator. (2)
5. Give the differences between Isolator and Circulator? (3)
6. The input power in a two hole directional coupler is 1 mW. The coupler has a coupling factor of 15 dB and a directivity of 30 dB. Calculate the power in all the ports? (3)
7. Define Transit time in Reflex klystron. (2)
8. Why slow wave structure is used in TWT? Mention its characteristics? (3)
9. Define Gunn Effect? (2)
10. List the applications of Varactor diode? (3)

PART-B (5X10=50 Marks)

11. Derive the field expression for TMmn modes in parallel plate wave guide. What happens when m=0? (10)

12. a) Explain the wave impedance of rectangular waveguide in TE and TM modes? (7)
    b) Dominant mode is propagating in rectangular guide 2.2 cm X 1 cm & frequency of operation is 9 GHz. Find guide wavelength. (3)

13. For rectangular wave guide of size 3 X 1cm, frequency of propagating signal is 10 GHz. Find characteristic wave impedance, phase velocity. What will be the input VSWR if this guide is terminated in a load of 500 Ω? (10)

14. a) Derive the scattering matrix of a Magic Tee. (7)
    b) An Isolator has insertion loss of 0.5 dB, an isolation of 25 dB and VSWR of 2, Find the S-matrix. (3)

15. a) Explain the working and applications of Travelling Wave Tube (TWT)? (7)
    b) Differentiate between linear and cross field devices? (3)

16. Explain the basic principle of operation of a Gunn diode & mention its applications? (10)

17. Write short notes on the following. (5+5)
    a) Attenuation in parallel plane guides
    b) Circulators

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Code No. 11225/S

FACULTY OF ENGINEERING

B.E. 4/4 (Prod.) I – Semester (Supple.) Examination, April/May 2019

Subject: Production Drawing Practice

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

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

PART – A (10 x 2.5 =25 Marks)

1. What is basic size, design size?

2. Fundamental tolerance unit is _____,

3. Fill in the blanks.

IT11	IT12	IT13	IT14	IT15	IT16
100i		250i			

4. What are objectives of geometrical tolerance?

5. Sketch the drawing indication of tolerance for

   (i) Straightness of prismatic component and

   (ii) Cylindrical component.

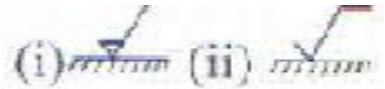
6. Sketch the drawing indication of tolerance for

   (i) Profile of a line,

   (ii) profile of a surface.

7. Sketch the Interpretation of tolerances for (i) parallelism (ii) total run out.

8. Indicate type of fits-clearance/transition/interference (i) H7-c8, (ii) H6-h5 (iii) H6-n5

9. Interpret the roughness machining symbols given as - 

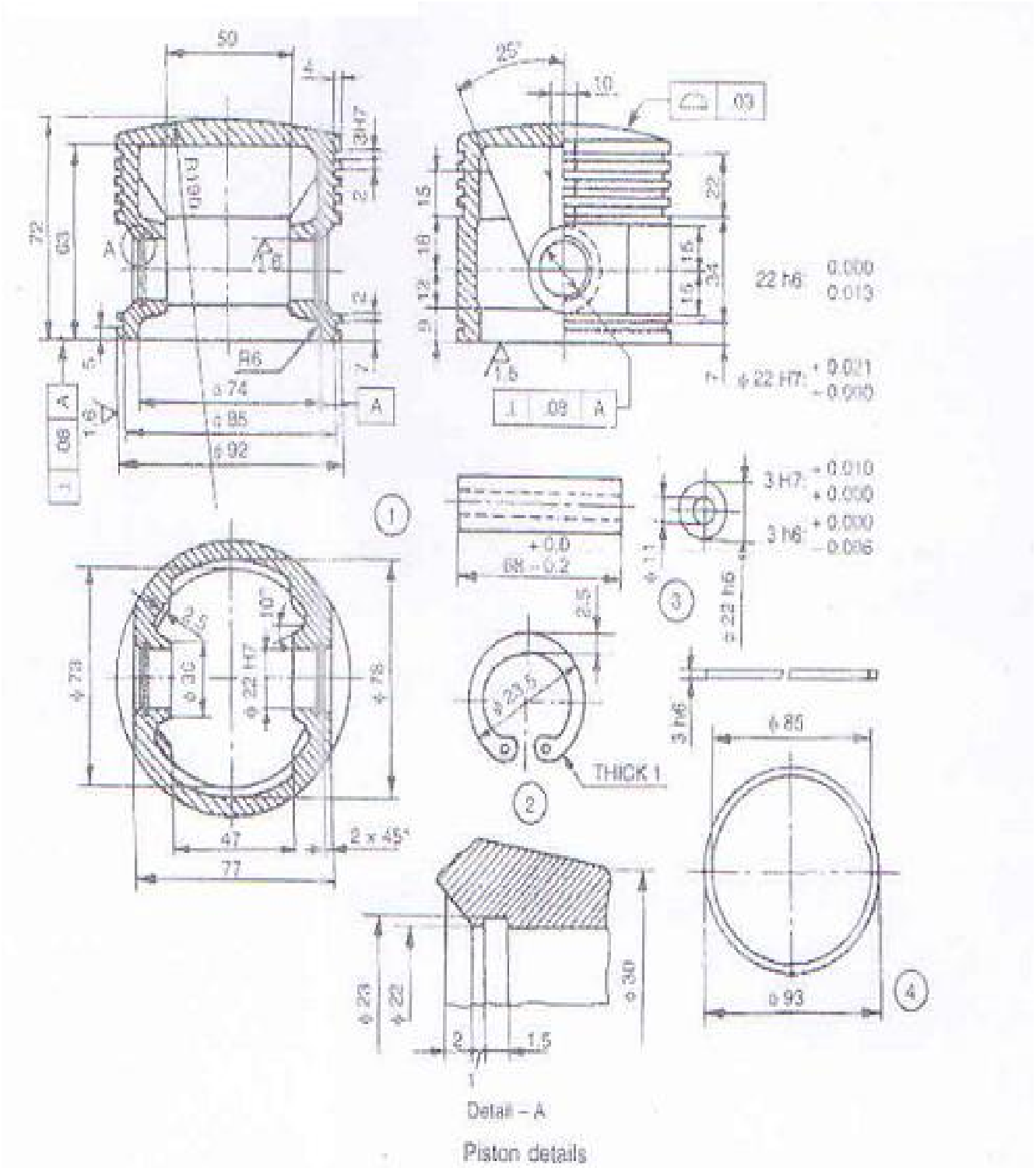
10. Fill in the blanks range of Ra___:

    Manufacturing Process ____;____;____

    grade Number ____

Contd..2

PART – B (50 Marks)



draw the (i) front view (ii) side view (iii) top view of piston assembly.

Draw the (i) front view (ii) Side view (iii) top view of piston assembly.

a. Draw the front section view. 15M
b. Draw side view. 15M
c. indicate the process planning piston 10M
d. What is the primary, secondary and tertiary datum located in the assembly. 3M
e. How many geometric tolerance are indicated in components? 2M
f. State all the geometric tolerance mentioned in the assembly. 5M

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Code: 11229/S

FACULTY OF ENGINEERING

B.E. 4/4 (A.E) I – Semester (Supplementary) Examination, April / May 2019

Subject: Automotive Pollution and Control

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. How does air pollutions occur due to auto vehicles?
2. Define Global warming.
3. What are the main pollutants emitted by S.I. Engines?
4. How does the humidity effects NOx formation?
5. How carbon monoxide emission could be reduced in C.I engines?
6. What is meant by EGR?
7. What is chemiluminescent analyser?
8. What is the cause of diesel smoke?
9. What is meant by FID? What for it is used?
10. What are the advantages of catalytic convertor?

PART – B (5 x 10 = 50 Marks)

11. Explain the various design and operating variables that effect the formation of HC and CO in S.I. Engine.
12. With a suitable sketch explain the method used for controlling evaporative emissions in S.I. engines.
13. What do you mean by evaporation loss and crank case blow by? Discuss its effects on air pollution.
14. Explain in detail about a three way catalytic converter with a neat sketch. Also explain the mechanism behind the carbon monoxide and UBHC oxidation and nitric oxide reduction.
15. Explain the construction and working principle of thermal reactor & Flame ionization detector.
16. Draw and explain the equilibrium and kinetic curves of nitric oxide formation in SI engines.
17. With a suitable diagram explain the followings.
    a) FTP test
    b) Chassis dynamometer.

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Code No. 11250/N/S

FACULTY OF ENGINEERING

B.E. 4/4 (I.T) I-Semester (Suppl.) Examination, April / May 2019

Subject : Middleware Technologies

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 are the different types of middleware?	3
2.	What are the various roles in EJB?	3
3.	Define Enterprise Application Integration	2
4.	What are the advantages of arrays in PERL?	3
5.	Differentiate between stub and skeleton	2
6.	What is the purpose of RMI Registry?	2
7.	What is CTS in NET?	3
8.	State the SAIM Principles	3
9.	What are the disadvantages of CGI?	2
10.	What is an interface Pointer?	2

PART – B (5x10 = 50 Marks)

11	a)	Explain service specific middleware with examples	5
	b)	Explain JDBC API	5
12	a)	What are the various types of variables in PERL? Give examples	4
	b)	Write a program using PERL CGI to accept and process form input	6
13	a)	What are the advantages of servelts over CGI?	4
	b)	Explain the servlet life cycle	6
14	a)	What are the different notes in EJB? Explain	4
	b)	Explain the lifecycle of a stateful session bean	6
15	a)	Explain CLR in **.**NET	6
	b)	Explain the remoting concept in **.**NET	4
16		Explain how you setup database in Django. Give examples	10
17		Write short notes on the following	
	a)	Marshalling and unmarshalling	3
	b)	CORBA object model	4
	c)	MSIL	3

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Code No. 11638/O/S

FACULTY OF ENGINEERING

B.E. 4/4 (IT) I-Semester (OLD) Examination, April / May 2019

Subject : Middleware Technologies

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

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

PART – A (25 Marks)

1.	Differentiate between MoM and RPC	3
2.	Write short notes on SoA	2
3.	What is validation frame work	2
4.	What are the servlet life cycle methods	3
5.	What is the meaning of in, out & in out specified I CORBA methods	3
6.	What is the difference between entity and session beans	2
7.	Write sample code to create a lesion object and invalidate existing session	3
8.	What is the difference between stab & skeleton	3
9.	Briefly explain what is IL code	2
10.	What is assembly in **.**NET framework?	2

PART – B (5x10 = 50 Marks)

11	a)	Explain the Architecture of MOM. How is its different from other types of middleware?	5
	b)	Write a servlet program for login validation	5
12	a)	Write steps to establish connection with JDBC	5
	b)	Explain the usage of annotations in EJB?	5
13	a)	Explain the flow of execution in struts	5
	b)	Write the differences between SOAP & REST	5
14	a)	List and explain any 5 CORBA Alternatives	4
	b)	Why CORBA objects need to be reference executed	3
	c)	What are the advantages of DII over static invocation in CORBA	3
15		How does **.**NET support multiple languages? Explain.	10
16	a)	Explain the importance of Marshalling in NET	5
	b)	What is the difference between web server and application server	5
17		Explain the Architecture of **.**NET frame work	10

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Code No. 11527 / CBCS

FACULTY OF ENGINEERING

B.E. (Civil) VI – Semester (CBCS) (Main) Examination, April / May 2019

Subject: Steel Structures

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

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

PART – A (10x2 = 20 Marks)

1 Illustrate the fillet weld using neat sketch in case of
(a) T joint (b) Lap joint
2 What are advantages of welded connections over bolted connections?
3 What is the effective length of a compression member if it is effectively held in position and rotation at both ends?
4 Differentiate between stiffened and unstiffened beam end connections.
5 Briefly discuss about block shear failure with neat sketch.
6 What are the forces for which the lateral bracing system for column is designed?
7 Write short note on splicing of column.
8 Mention codal provisions to prevent web crippling and web buckling.
9 What is the economical spacing of roof truss?
10 Find shape factor for square of side 'a' with its diagonal parallel to x-x axis.

PART – B (5x10 = 50 Marks)

11 Two plates 12mm and 20mm thick are to be jointed by double cover butt joint to sustain a factored design load of 825 kN use 4.6 grade 20 mm diameter bolts, and Fe 410 grade steel. 8 mm thick Cover plates 2 (one on each side). Design butt joint.

12 An ISLC 300 @ 324.7 N/m Fe 410 grade of steel is to carry a factored tensile force of 900 kN. The channel section is to be welded at the site to a gusset plate of 12 mm thick. Design a fillet weld, if the overlap is limited to 350 mm.

13 A tension member ISA 100 x 75 x 8 mm is connected to a 10 mm thick gusset plate the longer leg is connected to the plate using 4 Nos. of M20 bolts of 4.6 grade. Find the load carrying capacity of Tension Member.

14 Design a built up column 10m long to carry an axial load of 750 x 10^3 N. The column is restrained in position but not in direction at both the ends. Provide single lacing system with riveted connections. Assume f_y =250MPa. Design the column with two channels placed toe-to-toe, also design lacing system with welded connections.

15 Design a laterally unsupported beam of effective span 6m subjected to 500kNm bending moment and 200kN shear force use Fe 410 grade of Steel.

16 Design an I- section purlin, for an industrial building, to support a galvanized corrugated iron sheet roof for following data:
Spacing of truss c/c = 6.0 m
Span of truss = 12.0 m
Spacing of purlin c/c = 1.5 m
Intensity of wind pressure = 2kN/m^2
Weight of galvanized sheet = 130 N/m^2
Fe 410 Grade of steel

17 Write short note on the following:
a) Working stress method and limit state method
b) Shape factor

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Code No. 11549/CBCS

FACULTY OF ENGINEERING

B.E. (EEE) VI-Semester (CBCS)(Main) Examination, April / May 2019

Subject : Electrical Machines – III

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 Pitch factor and distribution factor of a synchronous machine. [2]
2. Why salient pole alternators are more suitable for low speed and non-salient pole alternators for high speed operation? [2]
3 Explain, why the field winding is placed on rotor, instead on stator of an alternator? [2]
4 What are the conditions to be satisfied for parallel operation of alternators? [2]
5 What is the function of synchronous condenser? [2]
6 What is power circle of a synchronous motor? [2]
7 Describe symmetrical and asymmetrical short circuit currents. [2]
8 Explain in brief, the working of a permanent Magnet Synchronous Motor (PMSM). [2]
9 Explain in brief, any two operational modes of Switched Reluctance Motor (SRM). [2]
10 Draw the Torque – Torque Angle Characteristics of Brushless DC Motor (BLDCM). [2]

PART – B (50 Marks)

11 (a) Explain the following terms related 3-phase a.c. windings. i) Single-layer and double-layer windings. ii) Full-pitch and short-pitch windings. iii) Integral slot and fractional slot windings. [5]
(b) A 16 pole alternator has 144 slots. If the coil pitch is kept 5 slots, then calculate its pitch factor. [5]

12 (a) Develop a solution for regulation of a salient pole synchronous generator. [5]
(b) A 550V, 55kVA, 1-Phase alternator has an effective resistance of 0.2Ω. A field current of 10 A produces an armature current of 200A on short-circuit and an electromotive force of 450 V on open circuit. Calculate the full load regulation with 0.8 power factor lagging. [5]

13 (a) What could be the reasons for failure in starting a synchronous motor? Suggest different remedies. [5]
(b) The input to an 11000V, 3 phase star connected synchronous motor is 60A. The effective resistance and synchronous reactance per phase are respectively 1Ω and 30Ω. Find the power supplied to the motor, and the induced electromotive force for a power factor of 0.8 i) lagging ii) leading. [5]

14 (a) Explain the symmetrical analysis of three phase short circuit of an alternator. [5]
(b) Explain the construction and working of Permanent Magnet Synchronous Motor (PMSM). [5]

15 (a) Explain the construction and principle of operation of Switched reluctance motor. [5]
(b) Obtain the expression for the production of torque in switched reluctance motor. [5]

16 (a) A 4 pole, 3-phase, 50 Hz, star connected alternator has 60 slots with 4 conductors per slot. Coils are short pitched by 3 slots. If the phase spread is 60^0, find the line voltage induced for a flux per pole of 0.0943 Wb distributed sinusoidally in space. All the turns in phase are in series. [5]

(b) Two 3-ph alternators are working in parallel with the following particulars: Alternator 1: Z1 = (0.2+j2) ohms/ph; E1 = (2000+j0) V/ph Alternator 2: Z2 = (0.2+j2) ohms/ph; E2 = (2200+j100) V/ph Load: ZL = (3+j4) ohms/ph. Determine the kW output and power factor of each alternator. [5]

17 (a) Is it possible to vary the speed of synchronous motor by varying the field excitation or by any other method? Explain what happens when the field current is (a) increased (b) decreased [5]

(b) A 1MVA, 3.3kV, 50Hz 6-pole 3 ph round rotor synchronous motor has a p.u resistance of 0.01 and p.u synchronous reactance of 0.8. If E=1.4pu, find the value of maximum power input and corresponding armature current and power factor. [5]

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Code No. 11556/CBCS

FACULTY OF ENGINEERING

B.E. VI Semester (CBCS)(Inst.)(Main)Examination, April/May 2019

Sub: Biomedical Instrumentation

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 Bio potential. [2]
2. Define linearity of biomedical instrument. [2]
3. What do you mean by arrhythmia? [2]
4. What is mono polar recording in EEG? [2]
5. Explain briefly the origin of first and second heart sound. [2]
6. Define cardiac cycle. [2]
7. Why endoscope is called fibro scope? Define oto scope. [2]
8. Discuss properties of X-rays. [2]
9. Define Let Go current. [2]
10. Define Micro shock and Macro shock. [2]

PART – B (50 Marks)

11. a) Explain ink jet recorder with neat diagram. [7]
    b) Discuss basic requirements of bio amplifier. [3]
12. a) Explain electrocardiograph with neat block diagram. [5]
    b) Explain how noise problems are eliminated in ECG recording. [5]
13. a) Differentiate between direct and indirect methods for measurement of BP. [5]
    b) Explain blood flow measurement using electromagnetic principle. [5]
14. a) Write advantages and disadvantages of CT scan. [6]
    b) Write a short note on collimator. [4]
15. a) Explain briefly types of leakage currents. [6]
    b) What do you mean by threshold of perception? Define ventricular fibrillation. [4]
16. a) Explain mechanical conduction of heart. [5]
    b) Explain block diagram of electromyography in detail. [5]
17. Write a short note on
    a) Echocardiography. [5]
    b) Holter monitoring. [5]

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Code No. 11562 / CBCS

FACULTY OF ENGINEERING

B.E. (ECE) VI - Semester (CBCS) (Main) Examination, April / May 2019

Subject : Digital Communication

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 State the A-law of compression and expansion.
2 Contrast between DPCM and DM.
3 What is the need for Source coding?
4 Find the maximum entropy of a computer keyboard with 112 keys.
5 What are different types of errors that occur during transmission?
6 Compare linear block codes and convolutional codes.
7 Differentiate between PSK and QPSK.
8 Briefly discuss the steps involved in optimum receiver design.
9 What is Jamming Margin? State its significance.
10 Differentiate between fast and slow frequency hopping.

PART – B (50 Marks)

11 a) Explain the working of a DPCM system with the help of suitable block diagram and necessary pre-requisites. What is the advantage of DPCM over PCM system. 6

b) A 2 KHz sinusoidal message signal is applied as input to a PCM system with 256 Quantization levels. Find the signal to quantization noise ratio (SNR_Q) in dB. 4

12 a) Illustrate the Huffman source coding procedure for a source that emits '6' symbols with probabilities given as 0.3, 0.2, 0.16, 0.12, 0.12 and 0.1. Determine the coding efficiency and redundancy. 6

b) Derive the expression for channel capacity of Binary symmetric channel. 4

13 a) Consider a (7, 4) linear code whose generator matrix

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

i) Find all the code vectors of this code
ii) Find parity check matrix
iii) Find minimum weight and minimum distance of the code 6

b) Draw the encoder structure of a rate 1/2 convolutional coder g_1=(101) and g_2 = (011). Find the codewood for an input 011. Find the codeword for an input 011. What is the constraint length of this code. 4

..2

14 a) Derive an expression for probability of error for coherent ASK signaling scheme. 5
b) With the help of block diagram explain DPSK modulation and demodulation. 5

15 a) Explain the working of Direct sequence spread spectrum system with necessary mathematical analysis. 5
b) Discuss how FHSS signal is tracked using Early-Late Gate. 5

16 a) Explain the working of a PCM system with neat block diagram. 7
b) Consider an AWGN channel with 4KHz bandwidth and the noise power spectral density ($N_0/2$) is 10^{-12} W/Hz. The signal power required at the receiver is 0.1 mW. Calculate the capacity of the channel. 3

17 Write short note on :
a) Minimum Shift Keying 5
b) PN sequence generation using LFSR (1, 3) and properties 5

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Code No.11570/CBCS

FACULTY OF ENGINEERING

B. E.VI – Semester (CBCS)(Mech.)(Main) Examination, April / May 2019

Subject: Metal Cutting & Machine Tools

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

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

PART – A (10 x 2 = 20 Marks)

1. Sketch geometry of single point cutting tool and indicate angles and edges.
2. Enlist the type of chips produced in metal cutting? What is the effect of BUE on surface finish.
3. What are types, functions and properties of cutting fluids?
4. Define tool life. State the Taylor's tool life equation.
5. Differentiate between tool holding and work holding devices with examples.
6. Define indexing? What are indexing methods used in milling?
7. Distinguish between buffing and burnishing.
8. Briefly describe the principle of thread rolling.
9. What are the various quick clamping devices used in fixtures?
10. What are the advantages and limitations of EBM machining?

PART – B (50 Marks)

11. (a) Explain the nomenclature of single point cutting tool by ORS system. 4
    (b) The following data were obtained while orthogonal cutting of M.S. rod of 110 mm diameter with 10^{o}rake angle tool, cutting speed 20m/min, feed 0.22 mm/rev, length of chip in 120 mm, cutting force 1600 N, feed force 750 N. Calculate
    (i) Shear plane angle
    (ii) Chip thickness,
    (iii) Chip velocity and
    (iv) Power required for cutting.(missing data may be suitably assumed) 6

12. (a) Explain the sources of heat generation and distribution in metal cutting. 5
    (b) Taylor's tool life equation for HSS tool is given as $VT^{1/2} = C_1$ and then for carbide tool $VT^{1/5} = C_2$ taking that at a speed of 25 m/min, the tool life was 160 min in each case. Compare their cutting life at a speed of 35 m/min. 5

13. (a) Explain the principle and applications of horizontal boring machine with aid of a neat sketch. 5
    (b) Explain with suitable diagram the quick return mechanism used in shaping machines. 5

14. (a) Discuss the working principle of center less grinding with help of a neat sketch. 5
    (b) Explain the gear production methods and gear finishing methods. 5

15. (a) What are the design principles for clamping and location? 5
    (b) Explain the working principle of ECM with aid of neat sketch. 5

16. (a) What is the function of indexing head as a milling attachment? Explain its working. 5
    (b) Explain the full type broaching operation with help of neat sketch. 5

17. (a) Derive the shear solution according to Lee & Shafer's theory. 5
    (b) How the grinding wheels are specified? Explain with an example of each term. 5

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Code No.11577/CBCS

FACULTY OF ENGINEERING

B. E.VI – Semester (CBCS)(Prod.)(Main) Examination, April / May 2019

Subject: Metal Casting and Welding

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

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

PART – A (10 x 2 = 20 Marks)

1. What is meant by directional solidification? 2
2. What are the allowances provided on pattern in investment casting? 2
3. State the brazing procedure 2
4. State the principles of good brazing. 2
5. State four application of MEMS. 2
6. State the thermosetting materials properties. 2
7. State the metallurgy of the joint by LBM process. 2
8. State diffusion welding parameters. 2
9. Sketch all the defects caused due to Are welding. 2
10. What results does the cruciform test of welds indicate? 2

PART – B (10 x 5 = 50 Marks)

11. (a) Explain how Bernoulli's principle is used in designing of gatting system. 5
    (b) Sketch Cupola furnace and explain it's working. 5
12. (a) Explain the Investment Casting method with neat sketch. 5
    (b) Sketch ten defects formed due Die Casting Process. 5
13. (a) Explain the mechanism of cold working with neat sketch. 5
    (b) Explain the ultrasonic equipment set up and its operation. 5
14. (a) Explain the properties of welding Al and Al alloys using Arc Welding 5
    (b) Explain welding characteristics of Al and Al alloys using MIG welding. 5
15. (a) Explain the hot cracks with testing with neat sketch. 5
    (b) Explain Plastic blow Moulding Processes with neat sketch with advantages. 5
16. (a) Explain the process parameters in friction welding with neat sketch. 5
    (b) Explain the suitability of Thermoplastics of moulding materials for casting. 5
17. (a) Sketch five defects informed sand cast components. 5
    (b) Sketch five weld defects formed by Arc welding. 5

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Code: 11581/CBCS

FACULTY OF ENGINEERING

BE VI Semester (CBCS)(A.E) (MAIN) Examination, April/May 2019

Subject: DESIGN OF AUTOMOTIVE COMPONENTS

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

Notes: Answer all questions from part-A & answer any five question from part-B

PART – A (20 Marks)

1. What are the differences between Dry and Wet Liner?
2. Why connecting rod made of "I" section?
3. List out any four advantages of chain drive over belt drives.
4. Maximum load applied on the leaf spring is 75 KN. Distance between eyes of the spring is 1m, total number of leaves 8, b = 9t, t = 12mm. find out equivalent stress on the spring?
5. Classifying the Roller Bearing according to the rolling element.
6. Radial clearance is 0.025mm, radius of the journal bearing 25mm,viscosity

   NS/mm^2 , load acting on the bearing 3 kN, length of the bearing is 50mm.

   Determined Sommer field Number
7. Define Anti-Frictional bearing.
8. Explain Pitch Circle.
9. Define viscosity and viscosity index.
10. Why Pre-load applied on the Semi-elliptical Spring?

PART – B (50 Marks)

11. Design an exhaust Valve for diesel engine for following specification:

    Cylinder bore diameter 150 mm, stroke length 300 mm, engine speed 575 rpm, Maximum gas pressure inside the cylinder 4N/mm^2 and seat angle 45^o Calculate:
    Diameter of port.

    2) Diameter of the Valve head.

    3) Diameter of the Valve stem.

    4) Thickness of the Valve head and Maximum valve lift.

12. Design the center crank shaft for diesel cylinder vertical engine:

    Cylinder bore 150 mm, $\left(L/r\right) = 4.75$, Maximum gas pressure 4 N/mm^2 length of the stroke 175 mm. Weight of the fly wheel cum pulley 3.5 kN, total belt Pull = 1.8kN allowable bending stress and allowable compressive stress as 75 N/mm^2, allowable

    bearing pressure is 10 N/^{2} Main bearing are 350mm apart and third bearing is 400mm apart from Main bearing.

Contd..2

Calculate:
1) Diameter and length of the crank pin.
2) Width and thickness of flanges.
3) Reaction of the bearing.
4) dia of shaft under the flywheel

13. Design a full hydro-dynamic journal bearing with following specification:

journal diameter 75mm, Radial load15kN, journal speed 1200RPM, =23 microns,

inlet temperature is 40°C.Assume (FV=5.79 and FV=3.99) calculate:

1) length of the bearing.

2) Viscosity (if S=0.3).

3) Temperature rises. And

4) Average temperature of the lubricant.

14. Leather belt transmitting 20kW Power, center to center distance between the pulleys is twice of diameter of big pulley. Belt velocity is 23m/s, stress developed in the belt is 3 N/ , ρ=0.97gm/cc, f=0.3,t=5mm, small pulley speed=1440RPM,and big pulley speed 480RPM. Calculate:

1) Dia of pulleys.

2) Length of belt.(If open belt drive)

3) Belt Tensions

15. The following data is given for a pair of gear with 20° full depth Involutes teeth. Number of teeth on pinion 24, Number of teeth on Gear 56, speed of pinion

1200 RPM, Module 3mm, Service factor 1.5, face width 30mm, $= \frac{600N}{mm^2}$) , same material used for gear and pinion calculate :
1) Beam strength.
2) Velocity factor.
3) Rate of power can transmitted without bending failure.
(If the factor of safety is 5).

16. It is require to design a helical compression spring subjected to a maximum force of 8kN, Mean coil dia150mm, spring rate 75N/mm, $= 1250N/mm^2$ permissible shear stress is 30% of . Calculate:

1) Wire diameter.

2) Number of active coils (take G=81370 N/).

17. Give short notes on
a. Torque tube
b. Torque and speed ration calculation
c. Internal gear

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Code No. 11589/CBCS

FACULTY OF ENGINEERING

B.E. VI – Semester (CBCS) (CSE) (Main) Examination, April/May 2019

Subject: Design & Analysis of Algorithms

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

PART – A (2 x 10 = 20 Marks)

1. Explain asymptotic notations.
2. What is Knapsack Problem?
3. Why Multi stage graphs are needed?
4. Write Weighing Union algorithm?
5. Solve the recurrence relation

   $T(n) = T(1)$ $n = 1$

   $= a\ T(n/b)+f(n)$ $n > 1$

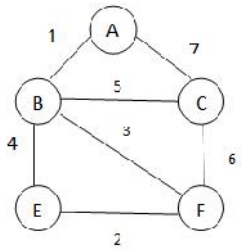
   for a, b=2, T(1) = 2 and f(n) = n

6. Define E-Node, live node and dead node.
7. List out the NP-Hard code generation problems.
8. Define DFS with example.
9. List the differences between divide and conquer and Greedy method.
10. State purging Rule and list out its applications.

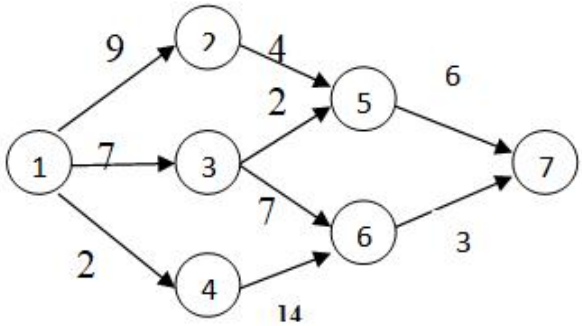
Part – B (5 x 10 = 50 Marks)

11. Explain Heap sort with algorithm and construct Max heap tree for the set of Numbers 15,8,20,12,9,1,34,4 (10M)

12. a) What is single source shortest path problem. Explain with an example. (5M)
    b) Define Spanning tree and explain Kruskal's algorithm for finding minimum cost spanning tree for the given graph.



13. What is multistage graph? Find the shortest path in the graph given bellow using Dynamic Programming. (10M)



14. Solve the knapsack problem using backtracking for the following problem: P={11,21,31,33,43,53,55,65}, w={1,11,21,23,33,43,45,55}, m=110, n=8. (10M)

15. Draw the portion of the state space generated by LCBB for the knapsack Instance. n=4,(p1,p2,p3,p4)=(10,10,12,18),(w1,w2,w3,w4)=(2,4,6,9) and m=15. (10M)

16. Explain job sequencing with deadlines algorithm and also find the solution for the instance n=7,(p1,p2,…p7)=(3,5,20,18,1,6,30) and (D1,D2,..,D7)= (1,3,4,3,2,1,2) (10M)

17. For the identifier set (a1,a2,a3,a4)=(count, float, if, while) with P(1)=1/20, P(2)=1/5, P(3)=1/10,P(4)=1/20,q(0)=1/5, q(1)=1/10, q(2)=1/5,q(3)=1/20, and q(4)=1/20 construct the OBST. (10M)

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Code No: 11599/CBCS

FACULTY OF ENGINEERING

B.E. VI – Semester (CBCS) (I.T) (Main) Examination, April/May 2019

Subject: Design & Analysis of Algorithms

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 Big-oh and Big-Omega notation.
2) State the weighting, collapsing rules in Sets.
3) What is the control abstraction for greedy method?
4) Define minimum cost spanning tree.
5) What is principle of optimality?
6) Explain dominance rules in 0/1 Knapsack problem.
7) What is meant by lower bound theory?
8) What is chromatic number of the graph?
9) Define satisfiability problem.
10) State the Cook's theorem.

Part – B (5 x 10 = 50 Marks)

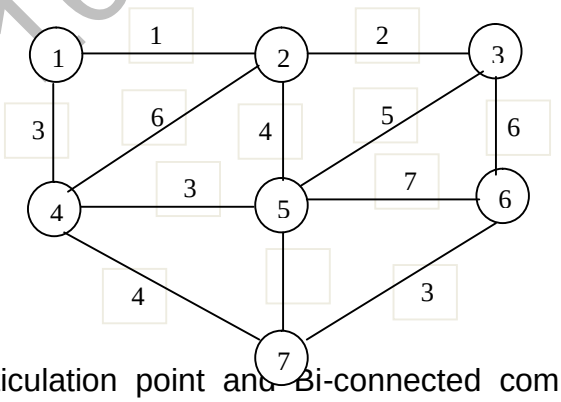
11. a) Consider a hash table of size 12. Insert the following keys into the hash table by using the hash function h(k) = (2k + 1) % 11 using linear probing.

12, 44, 13, 86, 23, 94, 11, 39, 20. (5 M)

b) Write about Asymptotic notations. (5 M)

12. a) Write a recursive algorithm for finding both the minimum and maximum elements in an array A of n elements. What is the running time? (5 M)

b) Find the minimum cost spanning tree for the graph given below. (5 M)



13 a) How to find articulation point and Bi-connected components from given graph? Explain with an example. (5 M)

b) Design a three stage system with devices D1, D2, D3. The costs are $40, $30, $20 respectively. The cost of the system is to be no more than $110 the reliability of each device type is 0.9, 0.7, 0.5. (5 M)

14 a) Write an algorithm for n-Queens problem using backtracking approach. (5 M)

b) Explain LC Branch and Bound. (5 M)

contd…2

15. a) Discuss NP-hard code generation problem. (5 M)

    b) Explain node cover decision problem. (5 M)

16. a) What is the optimal solution generated using greedy approach for job scheduling with deadlines when n =7, $(P_1, P_2, \ldots, P_7) = (3, 5, 20, 18, 1, 6, 30)$ and

    $(d_1, d_2, \ldots, d_7) = (1, 3, 4, 3, 2, 1, 2)$, where n is number of jobs, P_i is profit of i^{th} job, d_i is deadline of i^{th} job.(i = 1 to 7) (5 M)

    b) Explain multistage graph. (5 M)

17) Write a short notes on any <u>two</u> of the following.

    a) Optimal Binary Search Tree (5 M)

    b) Merge Sort (5 M)

    c) Multistage graphs (5 M)

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