

LICENSE EXAMINATION - EXAMINATION QUESTIONS

The examination for a Cinematograph Operators License consists of a number of separate parts, each of which must be completed satisfactorily before progressing to the next stage.

1. FILM JOIN AND QUESTION ON HANDLING OF FILM

As it is considered vital that an operator is efficient in care and maintenance of film, an applicant for a permit must pass the following before a permit is issued.

(a) FILM JOIN - A join in a piece of film supplied by the Board must be submitted. Refer to the chart on film joining.

(b) QUESTION ON HANDLING OF FILM

This question is :

"When a complete programme is received at your theatre from an exchange -

1. What procedure do you adopt for receiving and storing the programme?
2. What is the film examined for?
3. What type of faults would you expect to find and explain the action you take if damage is found".

At the end of the list of past examination papers is a MODEL ANSWER to this question.

Study the model answer before attempting the question.

2. WRITTEN EXAMINATIONS

The examination is based on the syllabus set down in Regulation 82 of the Electricity Act Regulations.

For convenience, parts 2 and 3 (A.C. and D.C. electrical papers) are combined, making a total of 3 papers.

The list of past examination questions attached is based on questions that have appeared in papers over more than 20 years.

If you can answer these questions you will pass the written examinations.

3. AFTER PASSING THE WRITTEN PAPERS

A practical is arranged when sufficient candidates are ready.

The practical is held on Sunday morning and for this examination the operator is expected to be able to identify all parts of the Cinematograph, their uses and susceptibility to wear. Remedies for machine malfunctions. Tests to be made (take up - direction of current) Arc - carbons, diameter, mirror focus and alignment.

PAST EXAMINATION QUESTIONSSECTION I : OPTICAL SOUND & REPLICATIONSQUESTIONS:

1. (a) Explain fully -
 - (i) the optical axis
 - (ii) the Parabolic and Elliptical Mirrors and what they are suited for
 - (iii) Chromatic Aberration.
 - (iv) Spherical Aberration.(b) What is the projection angle?
(c) Describe the process of measuring the focal length of a simple lens.
(d) Draw a projection lens and name all combinations.
2. Sketch the optical systems of any two projectors, showing clearly the paths of light rays - sketches to include both mirror and vertical arcs, path of light ray and lens in Sound Head.
3. Sketch the following -
 - (a) The optical system of a Sound Head
 - (b) The path of light from mirror to screen of a mirror arc. Sketch to include projector lens.
 - (c) The path of light from arc to screen of a vertical arc. Sketch to include projector lens.
 - (d) Explain and show by sketch the difference between a Parabolic and Elliptical Mirror.

3. Sketch the following -
 - (a) The optical system of a Sound Head
 - (b) The path of light from mirror to screen of a mirror arc. Sketch to include projector lens.
 - (c) The path of light from arc to screen of a vertical arc. Sketch to include projector lens.
 - (d) Explain and show by sketch the difference between a Parabolic and Elliptical Mirror.

4. Draw a diagram of the following lenses -
 Biconvex, Concave, Miniscus and two combinations for condensers and also a diagram of an assembled projection lens and mark the end which faces the screen.

5. Name five foreign noises which could develop in the sound system. How and where you would locate and correct them.

6. Fully explain the following -
 - (i) Variable Density Sound Track
 - (ii) Variable Area Sound Track
 - (iii) Magnetic Sound
 - (b) Sketch types of sound track.
 - (c) State which sound track is more liable to cause faulty reproduction Why is this?

7. Sound ceases during the show, the machine is in operation. What steps would you take, and why?

8. (a) Name type, size and number of fire extinguishers required, in a bio box.
 (b) What other fire fighting appliances are needed?

9. Sketch the front wall of a typical bio box showing all ports and openings, and indicate the size of each.

10. Describe the gravity wall shutters required in a bio box.

11. In what way is film likely to be damaged if the take-up clutch

11. contd.

- (a) too light (b) too loose

12. Name two ways that film can be damaged by careless rewinding and describe the damage caused in each case.

13. What means are used to protect film against mechanical damage during transport?

14. Name five safety devices fitted to a projector to protect film against fire.

15. What causes the following -

- (a) Rain on film
(b) Stretched film
(c) Buckled film

16. Can a film with a track magnetic sound be run through a projector equipped only for optical sound? Give a reason for your answer.

17. When a new print is received from the film processing laboratories it is generally described as being green. How would you recognise such a print and what special precautions should be taken whilst screening it?

18. When is it necessary to have mechanical exhaust systems on arc lamps? What must be the minimum capacity of these systems?

19. Describe the procedure for making a film splice.

20. (a) At what speed should film be rewound?
(b) How must film be held with the left hand for checking whilst it is being rewound.
21. (a) Can safety film be screened from a position other than an approved bio box?
(b) What should an operator check before striking an arc?
22. Describe types of damage you would expect to find in film which has had considerable use and what action you would take in regard to each type.
23. (a) How is sound produced from electrical impulses?
(b) Why is the impedance of a speaker matched to the amplifier output?
(c) What is the function of a Cross-over Unit used in conjunction with two speakers?
(d) What is a Multi-cellular horn and for what is it used?
24. (a) What is the difference between a voltage amplifier stage and a power amplifier stage?
(b) Describe the action of a valve when used as a half wave rectifier.
(c) Why is bias voltage applied to an amplifier valve?
(d) What is an output transformer in an amplifier for?
(e) What is meant by "using two valves in push-pull"?
(f) Where is the pre-amplifier usually located. Why?
25. How is stereophonic sound transmitted from the film to the auditorium?

26. Describe a practical method of focussing the optical assembly in a sound head.
27. What happens if the sound slit is too wide, or not perfectly horizontal or off-centre?
28. Describe the function of a PE cell. Sketch a PE cell suitable for motor picture sound reproduction.

On the diagram show the PE Cell connected to the first stage of an amplifier using resistance capacity coupling.

29. (a) Describe what is meant by a "Blocked lens".
(b) Does a lens deteriorate with age? Give details.
(c) Why are good quality lenses made with a blue tint?
30. How often would you change the sapphire stylus of a non-sync pick up unit under normal theatre use?
31. Why is the lead to the amplifier from the PE Cell shielded?
32. Name the types of baffles used for high and low frequency speakers. Why are two or more speakers used in modern sound reproduction?
33. Sketch the following lenses :
- Bi-Convex
 - Concave meniscus
 - Convex meniscus
34. List the fire fighting equipment in a bio box.
35. Describe the construction of a bio box.
36. Under what conditions can acetate film be screened outside a bio box?

EXAMINATION FOR LICENSURE

SECTION II. - ELECTRICAL (AS PER DE).QUESTIONS:

1. Define the following - Impedance

Ohm Law (3 formulae), Parthed Situation, Ohm, Ampere, Volt, Volt-Amp, Watt, Power Factor, Re-actance, inductance, resistance, capacitance, frequency. Series and parallel connections.

2. Two cinematograph machines are installed side by side in a cabin provided with a rubber floor covering. By some unforeseen circumstance neither machine is earthed. The operator worked on each machine and did not receive a shock. When he contacted both machines he received a severe shock. State -

- (a) What do you think was wrong with either or both machines to cause this?
 (b) How would you eliminate this hazard?
 (c) What would you expect to happen to the fuse controlling one of the machines when you carried out (b)?
 (d) The reason for your answer to (c)?

3. The "Rules" provide that all lighting fittings installed in a cinematograph cabin shall be rigidly and securely fixed in position. They shall be of a type which completely enclosed the lamp and the form of enclosure shall not be inferior to that afforded by a well-glass type of lighting fitting. State -

- (a) The necessity for this "rule".
 (b) Why would a universal type bracket light be not considered suitable?
 (c) Why are portable lamps strictly prohibited for use in a cinematograph cabin?
 (d) What provisions should be made to allow threading up to be safely done?

4. If on reporting for duty you discovered after a visual examination that a conductor was damaged on a conduit between the switch-board in the "Box" and a cinema machine, and upon removing it you found the wire burnt through about mid-way, state -
- (a) How would you rectify the fault?
 - (b) Would you be permitted to enclose a joint in conduit?
 - (c) If not, what provisions with regard to the conduit should be made so that a joint can be enclosed?
 - (d) What types of joints, if any, are permitted and how are they insulated (if necessary)?
5. When replacing a fuse, it is necessary that the size and ampere carrying capacity of the conductor (a) protected by it be intact. Why is this?
6. The mains entering a cinema cabin enter the switch before the fuse. State the reason for this.
7. The conductors for cinematograph machines and accessories shall be taken as a separate circuit from the motor generator, rectifier converter, or transformer terminals or from some other suitable supply source.

14. Is an electric fan permitted in a cinematograph cabin? If so, what precautions must be taken when installing same?
15. How do you reverse the direction of rotation of A.C. single and 3 phase motors?
16. Describe the construction and uses of various types of transformer (auto-transformer, step-up transformer, step-down transformer).
17. Describe full-wave and half-wave rectification. Rectifying stacks, three phase rectification.
18. Describe the construction operation and use of a rotary converter.
19. Describe the construction and operation of a simple DC generator. Compound Wound, Shunt Wound.
20. Draw a diagram of the arc circuit including rectifier, resistances and switching. Show direction of current.
21. (a) If several resistances are wired in series what is their total effective resistance?
(b) Explain how voltage drop is made use of in a divider circuit.
(c) Give 5 causes of sparking at the brushes on the commutator of a DC generator and remedy for each.
(d) In an AC circuit containing only capacitance would the current lead, lag or be in phase with the voltage?

EXAMINATION FOR LICENSE.SECTION III : MECHANICAL.(MACHINE & PRACTICAL PROJECTION)QUESTIONS:

- Attached is a diagram of a projector -
 - On the diagram, name each part indicated by the arrows.
 - On the writing paper provided, explain in detail which parts are liable to damage the film, and how you would guard against such damage. Worn parts should be of vital interest to an operator, pay particular attention to this aspect when answering this question.
- Fully explain the following -
 - Three causes of starred sprocket holes.
 - What is meant by a travel ghost? What causes it and how is it overcome?
 - The construction of the take up mechanism and its adjustments.
 - With film travelling through a projector at 90 feet per minute at what R.P.M. would a 16 tooth feed sprocket be travelling?
 - Name four important causes how film can become damaged while running through a projector.
- Show by sketch two tubes in push-pull. Explain the advantages or otherwise of this type of coupling.
 - Explain the principles of a rectifier.
 - Explain the action of both Half-Wave and Full-Wave rectifier. Draw a diagram of each.
- Name five foreign noises which could develop in the sound system. How and where you would locate and correct them.

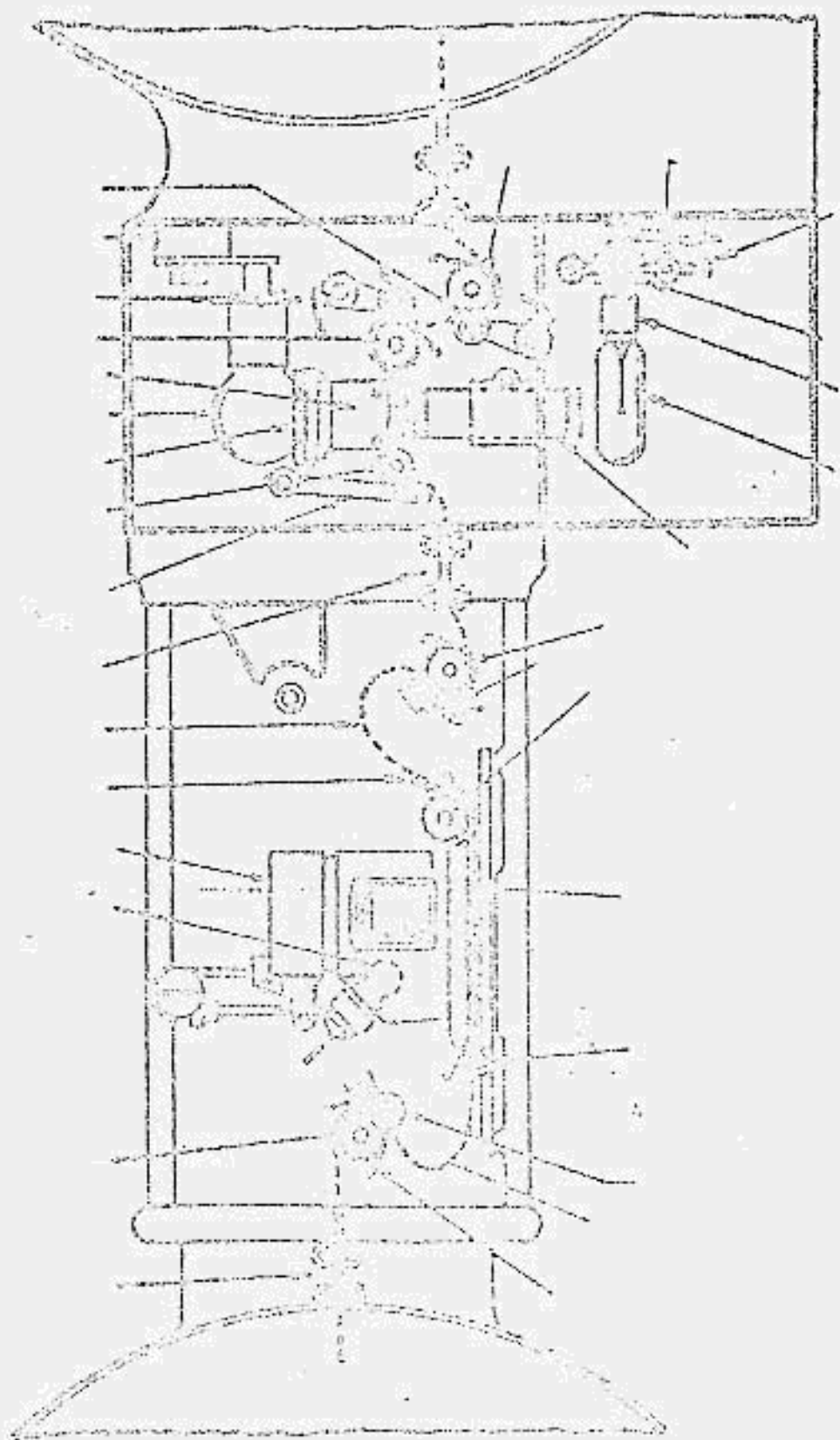
5. Explain the following -

- (a) What are these ratios and for what are they used?
1.33, 1.85, 2.35, 2.55 apertures.
- (b) Anamorphic fixed lens.
- (c) Anamorphic variable lens
- (d) Backing lens
- (e) Optical Sound
- (f) Perspecta
- (g) Stereophonic
- (h) Projection Angle

6. Draw a wiring diagram of a D.C. arc lamp circuit showing all controls, fuses, etc., using a rectifier.

7. Describe the operation of the following -

- (a) Tungar Rectifier.
- (b) Rotary converter
- (c) Motor Generator
- (d) Mercury Rectifier
- (e) Selenium Plate Rectifier for Arc in a Projector.



(c) Damage to Film

Damage can be caused to film by sprocket teeth "Climbing Out" of bad sprocket holes, or through poorly made splices, or through worn or badly adjusted sprocket idlers. The imprints on the film will show up on the screen and be heard in the theatre if the sound track is damaged. Remove affected portion and make a strong film join.

Cues made by punching, scratching or pasting on of change-over marks should be replaced by correct marking. Excessive damage or scratching, causing a poor image or distorted sound reproduction, dirty and excessively oily film should be reported to the exchange.

(d) Poorly Made Splices

A good film join lies flat and straight, will not come apart, and is barely visible. A join that does not meet these standards will have some noticeable affect as it passes through the projector.

(i) Loose Splices (caused by too much, too little or stale cement, incomplete scraping and cleaning of film, air bubbles, or lack of pressure on the join during setting time). The join may break cleanly in the projector. If one side only lifts, the film may tear down its length and stop the projector - danger of fire.

(ii) Buckled Splices Usually caused by too much cement. A buckled join may, with luck, clatter its way through a projector. But the sound track will be covered with a splash of cement which will be heard in the auditorium. A buckled join is likely to cause the film to jump off the sprocket teeth and cause damage already described.

(iii) Crooked Splices will put a great strain on the film, tear sprocket holes, cause sprocket idlers to jump out of the sprocket holes or break the film.

(iv) Mismatched Sprocket Holes a result of careless splicing. This fault reduces the size of the hole, which will clamp onto the tooth of a sprocket. If the film does not break it will cause the screen image to jump every time the join goes through the machine.

(v) Air Bubbles in an otherwise sound join eventually will cause a break - and it could be in YOUR projector.

(vi) Out of Frame Frames containing a join of course should have the normal four-a-side sprocket holes. A join which leaves less than 4 sprocket holes in a frame will show up immediately on the screen.

ALL POOR JOINS MUST BE REPLACED

Finally, a projectionist should treat all film in his hands with the utmost care and attention, avoiding passing on faults to the next operator to present the show.

HANDLING OF FILM ON RECEIPT FROM EXCHANGE

Model ANSWER

When a complete programme is received at your theatre from the exchange:

QUESTION

1. What procedure do you adopt for receiving and storing the programme?

ANSWER

Check to see that the correct film or films have been sent. Check and make certain that all reels have been sent. Rewind film to projection spools, checking for damage, etc. Store the film in its air-tight metal containers in the fire-proof cabinets provided in the rewind room. All film not running through the projector or on the rewinder must be stored away in the correct order in which the reels are to be used. Note general condition of the film for report to the exchange if necessary.

- (i) A film report should be made out in duplicate for every print examined, and a copy presented to the film exchange (through the theatre manager) if damage is found.
- (ii) The ratio must be checked before screening (i.e. cinema-scope, Wide Screen, etc).

QUESTION

2. What is the film examined for?

ANSWER

Check to see if reels are overloaded with excessive footage. Check film leaders for correct part numbers, length, and start frames, check tails for cue dots in their correct place. Check for dirty or oily film, strained or torn sprocket holes, check film for damage, check all joins.

QUESTION

3. What type of faults would you expect to find and explain the action you would take if damage is found?

ANSWER

(a) Dusty and/or Oily Film

Dust, oil, scraps of emulsion or film cement will accumulate on all moving parts in the projector in contact with the film, eventually restricting their free movement, causing damage to shoes, idlers, sprockets, etc., which when worn will damage other film passing through the machine. As far as is possible, the operator should try to remove surface dust or oil, but it is not possible for him in many cases to do much about dirty film.

(b) Damaged Sprocket Holes

Damage may be caused to sprocket holes because of worn sprocket teeth, or too much tension at the aperture or take up. Sprocket holes may be strained or torn, or the "bridge" between holes may be broken. Remove affected portion and make a strong film join.

REASON FOR FILM DAMAGE

Commencing with the upper spool box if the tension is too tight the film will be strained because of the excessive pull required by the upper feed sprocket. This also results in tearing of the sprocket holes in the film.

If the tension is insufficient, the spool will overrun and allow the film to scratch in the spool box, also when "creeping" around the spool. The film may also snap when the loop takes up.

Film trap rollers in the upper and lower magazines are the source of much scratching if the raised centre flanges become worn and allow the film to rub on the face of the rollers. Another cause is if dirt or grease stop the rollers from rotating.

With the constant friction of the film on the sprockets, the teeth become worn into the shape of a hook, (called undercutting). This tears the bridge of film between the sprocket holes.

Worn Idler rollers allow the inner flanges to come in contact with the film and will mark it even if the idlers are rotating normally.

Runner shoes in the "gate" if allowed to become worn, let the film rub on the back plate of the projector resulting in serious scratching. The main source of the shoes wearing is excessive tension on the pressure pads, which will in turn cause premature wearing of the intermittent sprocket and movement.

Similar components in the Sound head also caused damage when they become worn or misadjusted.

With too much tension on the lower take up spool straining of the film will result, also scratching by the action of the film slipping around the spool.

It can be said safely that any part of the projector that comes in contact with the film is a potential source of damage, and only by absolute cleanliness and constant inspection of the projector, with immediate replacement of worn parts can film be protected, and maintained in good condition.

19. (a) What is the highest frequency sound that can be produced by optical sound. Why is this so.
(b) On an optical print the sound is printed ahead of the action. By how many frames is it ahead, and why.
20. (a) What effect does "gate pressure" have on the film and the picture?
(b) Why do you have upper and lower "Film loops"?
(c) What is the difference between a front and rear shutter?
(d) What portion of the film is held on a sprocket in good condition?
(e) What is the "Flywheel" for?
21. (a) If the loop between two sprockets is being lost continually what would be the cause and remedy.
(b) What would cause the film to weave sideways through the projector gate?
(c) If the passage of the film through the sound head is not perfectly steady what happens to the sound?
22. If you had to change an exciter lamp during a performance what is a quick method of getting a satisfactory focus?
23. What is the correct sequence for bringing a machine to rest if the film snaps?

8. (a) Describe the action of an intermittent movement and draw the parts.
(b) State a make of projector on which the movement described is used, and state the defects likely to impair its action. How many times will the pin in the cam make complete turns per minute?
9. An arc is burning and using 60 amps from a rectifier, state -
(a) The carbon combination
(b) Size of gap
(c) Voltage across arc
(d) The reason for pencilling of negative carbon
(e) The angle of crater of positive carbon on a horizontal arc.
10. Is there any difference in the direct current from a battery, a generator, a single wave rectifier, and a dual wave rectifier? If so give full particulars of same.
11. Assuming one head amplifier has broken down, explain how you would connect up this machine temporarily carry on the performance, so as to run on two machines.
- Define the following-
12. Chromatic Aberration, Spherical Aberration, Travel Ghost, Short circuit.
13. (a) Explain fully "Standard Leader" attached to every reel of film.
(b) For what purpose are "Lateral Guide" rollers installed on projectors?
14. Explain the difference between a mirror and a straight arc lamp. For what purpose is each suited? Give reasons, also state approximate sizes of carbons and amperage for each type of lamp.

15. Describe the various carbons used in Cinema projection, and differences between A.C. carbons and D.C. carbons.

Why are some carbons copper coated?

What effect has moisture on carbons?

Why is the positive carbon larger than the negative in a DC arc?

Why is a condenser used with a vertical arc?

16. Describe "The Take-Up Test"

What is the function of the stripper plates?

Describe the following noises and state how they are overcome:

"Crackling"

"Intermittent frying"

"Hum"

"Motor Boating".

17. Explain and show by sketch the difference between a parabolic and an Elliptical mirror. What is each suited for?

18. Sketch the optical system of two types of projectors, showing the paths of light rays clearly. Include mirror and vertical arcs.